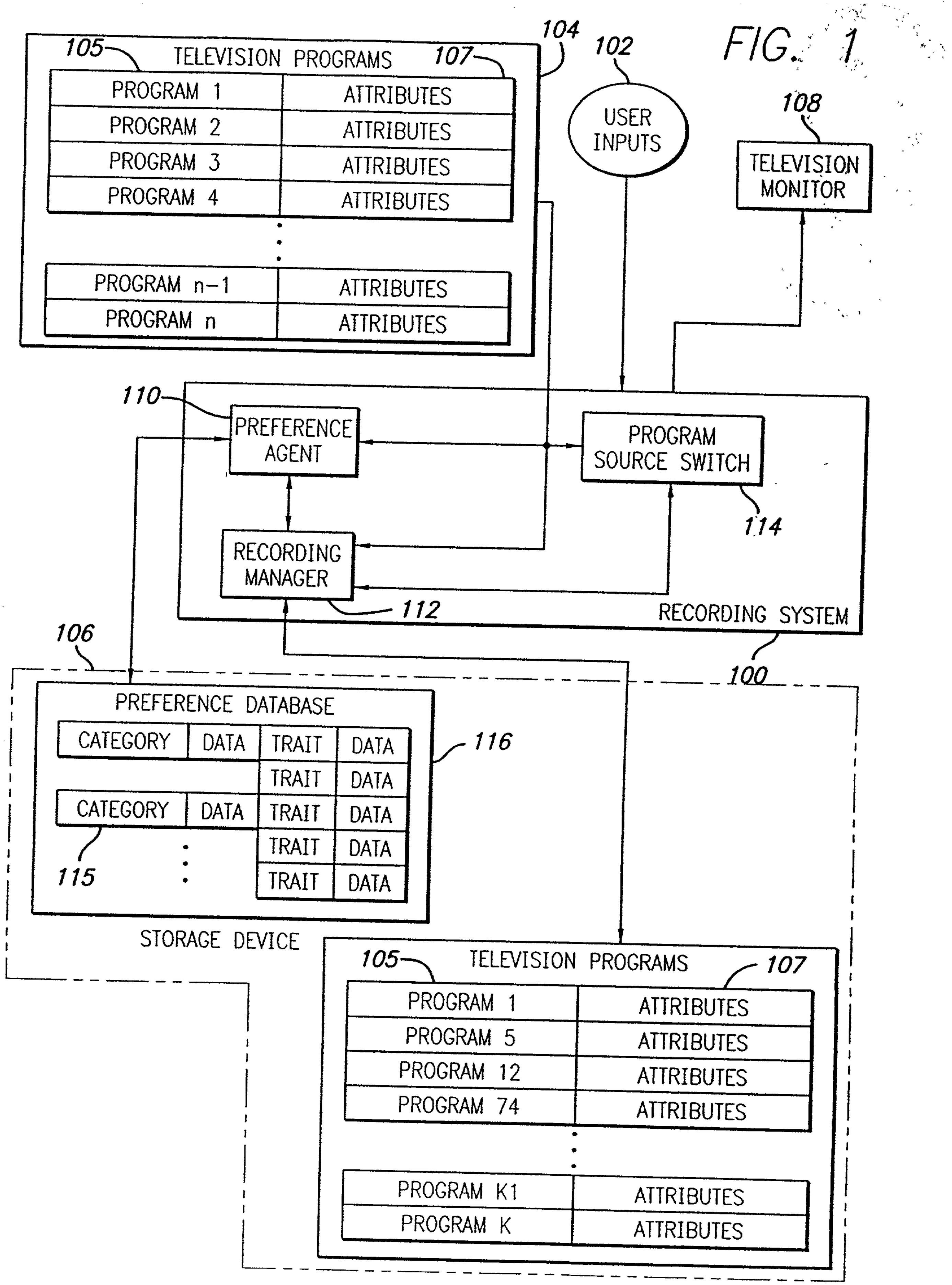
FIG. 1


104
102
108
105
TELEVISION PROGRAMS
107
PROGRAM 1
ATTRIBUTES
PROGRAM 2
ATTRIBUTES
PROGRAM 3
ATTRIBUTES
PROGRAM 4
ATTRIBUTES
PROGRAM n-1
ATTRIBUTES
PROGRAM n
ATTRIBUTES
USER INPUTS
TELEVISION MONITOR
110
PREFERENCE AGENT
PROGRAM SOURCE SWITCH
114
RECORDING MANAGER
112
RECORDING SYSTEM
100
106
PREFERENCE DATABASE
CATEGORY
DATA
TRAIT
DATA
TRAIT
DATA
CATEGORY
DATA
TRAIT
DATA
TRAIT
DATA
TRAIT
DATA
116
115
STORAGE DEVICE
105
TELEVISION PROGRAMS
107
PROGRAM 1
ATTRIBUTES
PROGRAM 5
ATTRIBUTES
PROGRAM 12
ATTRIBUTES
PROGRAM 74
ATTRIBUTES
PROGRAM K1
ATTRIBUTES
PROGRAM K
ATTRIBUTES

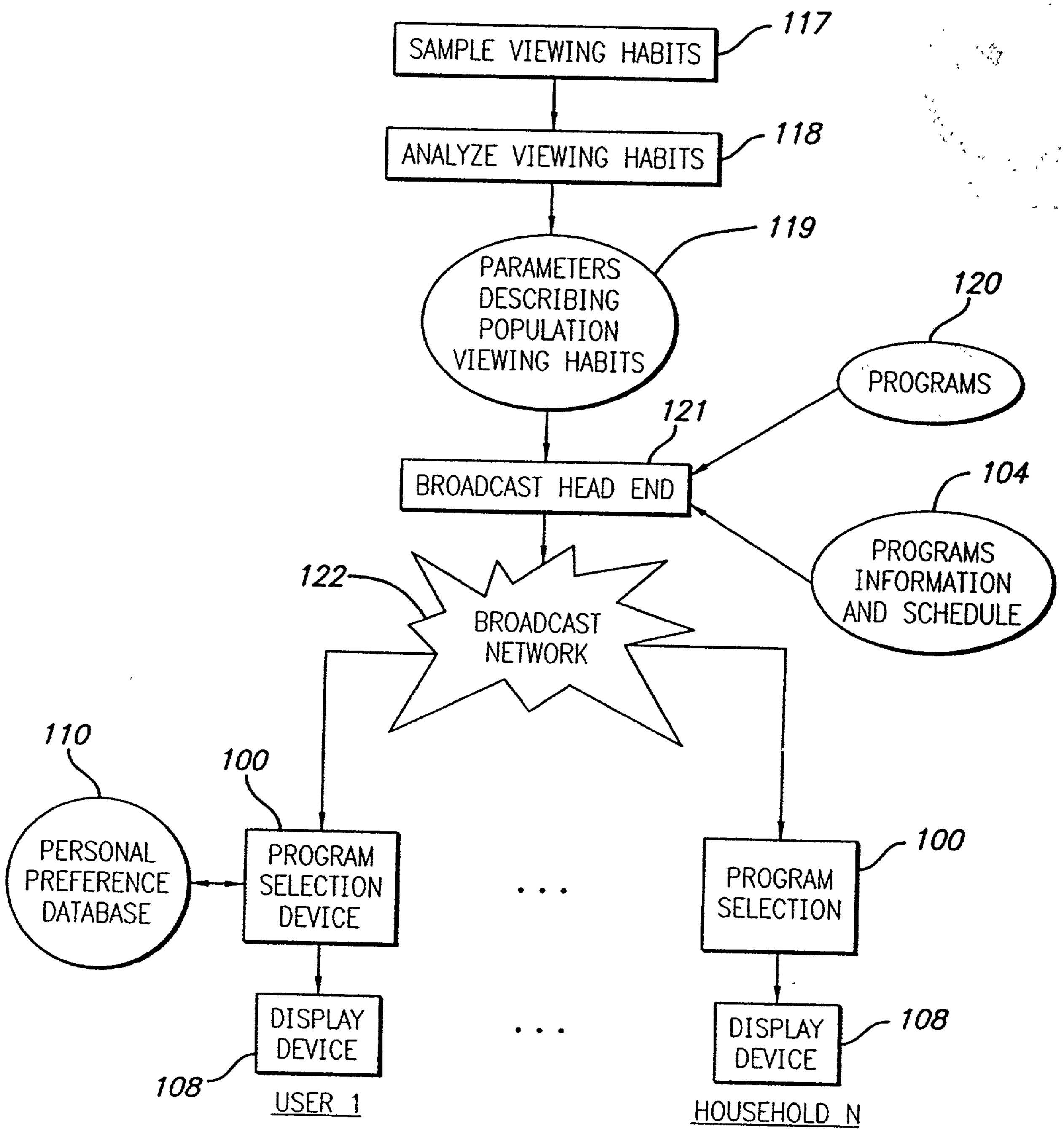
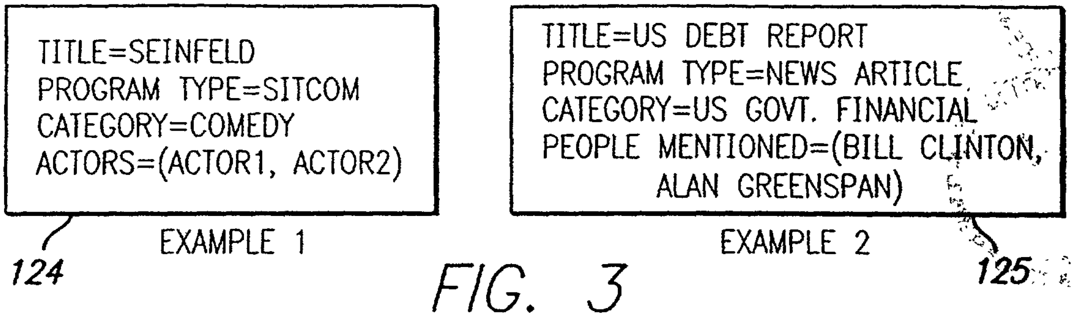

SAMPLE VIEWING HABITS
117
ANALYZE VIEWING HABITS
118
PARAMETERS DESCRIBING POPULATION VIEWING HABITS
119
120
PROGRAMS
121
BROADCAST HEAD END
104
PROGRAMS INFORMATION AND SCHEDULE
122
BROADCAST NETWORK
110
PERSONAL PREFERENCE DATABASE
100
PROGRAM SELECTION DEVICE
100
PROGRAM SELECTION
. . .
DISPLAY DEVICE
108
. . .
DISPLAY DEVICE
108
USER 1
HOUSEHOLD N

FIG. 2

EXAMPLES OF PROGRAM INFORMATION



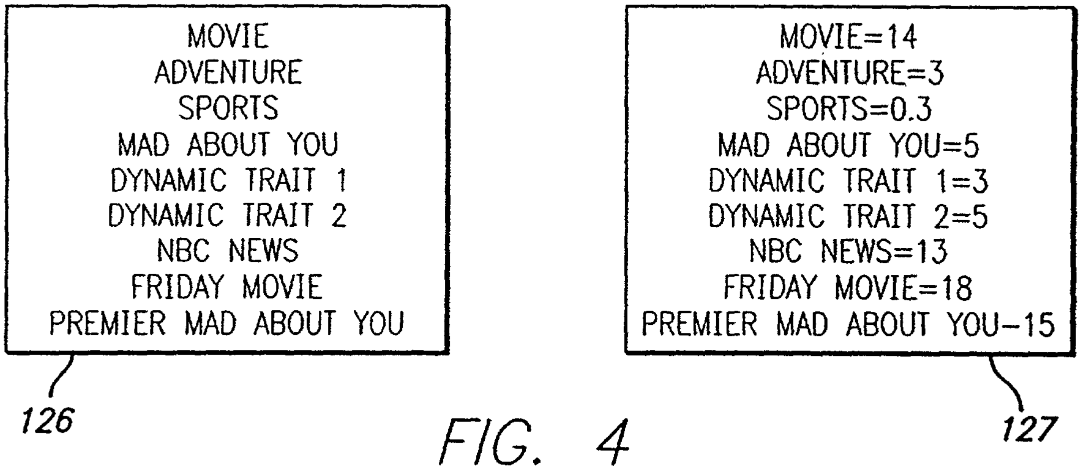
EXAMPLE 1

TITLE=SEINFELD
PROGRAM TYPE=SITCOM
CATEGORY=COMEDY
ACTORS=(ACTOR1, ACTOR2)

EXAMPLE 2

TITLE=US DEBT REPORT
PROGRAM TYPE=NEWS ARTICLE
CATEGORY=US GOVT. FINANCIAL
PEOPLE MENTIONED=(BILL CLINTON, ALAN GREENSPAN)

FIG. 3



EXAMPLES FOR TRAITS

MOVIE
ADVENTURE
SPORTS
MAD ABOUT YOU
DYNAMIC TRAIT 1
DYNAMIC TRAIT 2
NBC NEWS
FRIDAY MOVIE
PREMIER MAD ABOUT YOU

EXAMPLES FOR LIKING FOR VIEWER N

MOVIE=14
ADVENTURE=3
SPORTS=0.3
MAD ABOUT YOU=5
DYNAMIC TRAIT 1=3
DYNAMIC TRAIT 2=5
NBC NEWS=13
FRIDAY MOVIE=18
PREMIER MAD ABOUT YOU-15

FIG. 4

SOME SAMPLE VALUES FOR FIELDS IN TRAIT RECORD

TRAIT TYPE

STATIC
DYNAMIC
ASSOCIATION
GENERATED

TRAIT DESCRIPTION

(NBC, "NEWS").
SUBSTRING("CIA")IN DESC.
TITLE

DISTRIBUTION

NORMAL
EXPONENTIAL
DEFINED TYPE 1
DEFINED TYPE 2

DISTRIBUTION PARAMETERS

MEAN=13, DEVIATION=2

FIG. 11

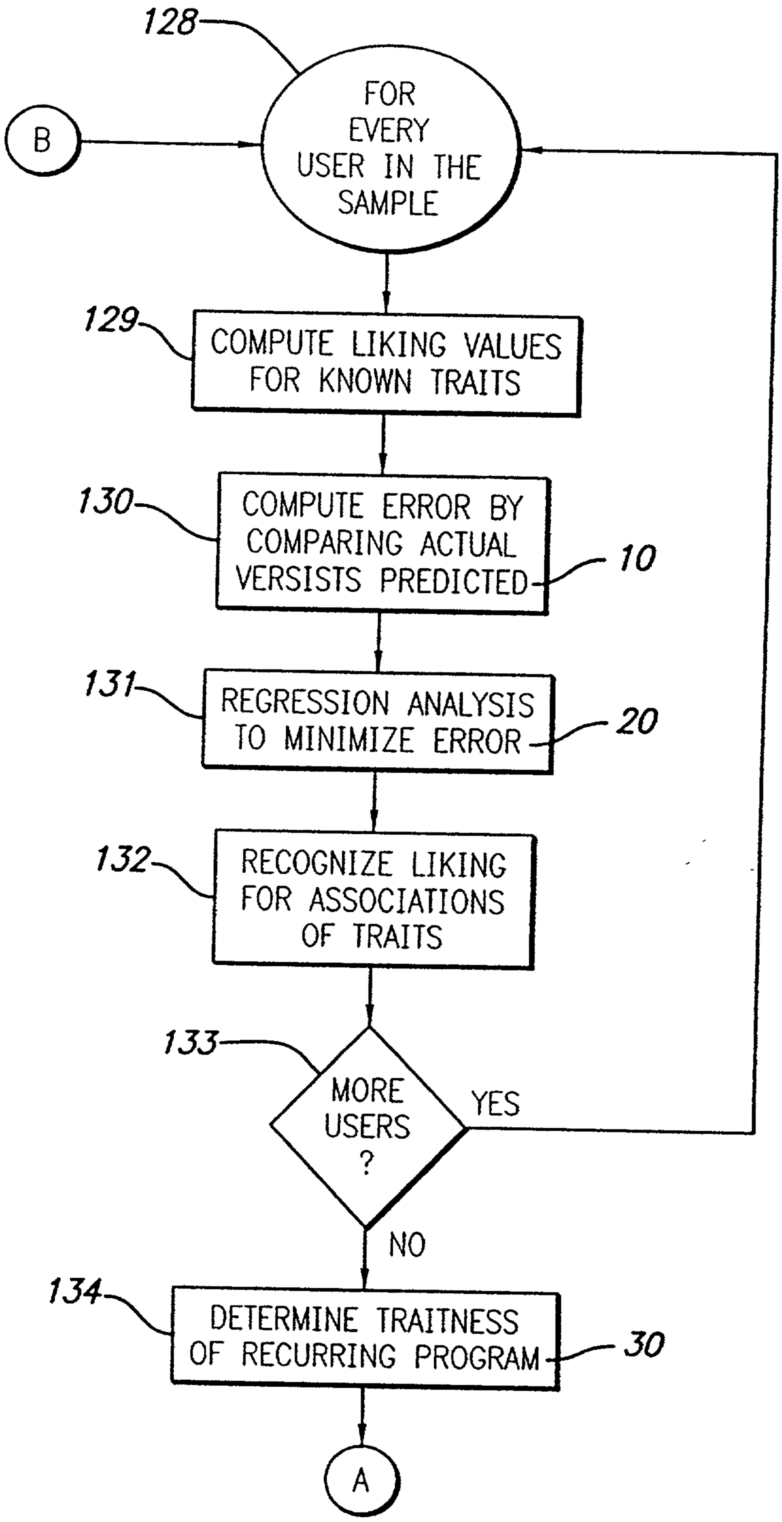

128
B
FOR EVERY USER IN THE SAMPLE
129
COMPUTE LIKING VALUES FOR KNOWN TRAITS
130
COMPUTE ERROR BY COMPARING ACTUAL VERSISTS PREDICTED
10
131
REGRESSION ANALYSIS TO MINIMIZE ERROR
20
132
RECOGNIZE LIKING FOR ASSOCIATIONS OF TRAITS
133
MORE USERS ?
YES
NO
134
DETERMINE TRAITNESS OF RECURRING PROGRAM
30
A

FIG. 5A

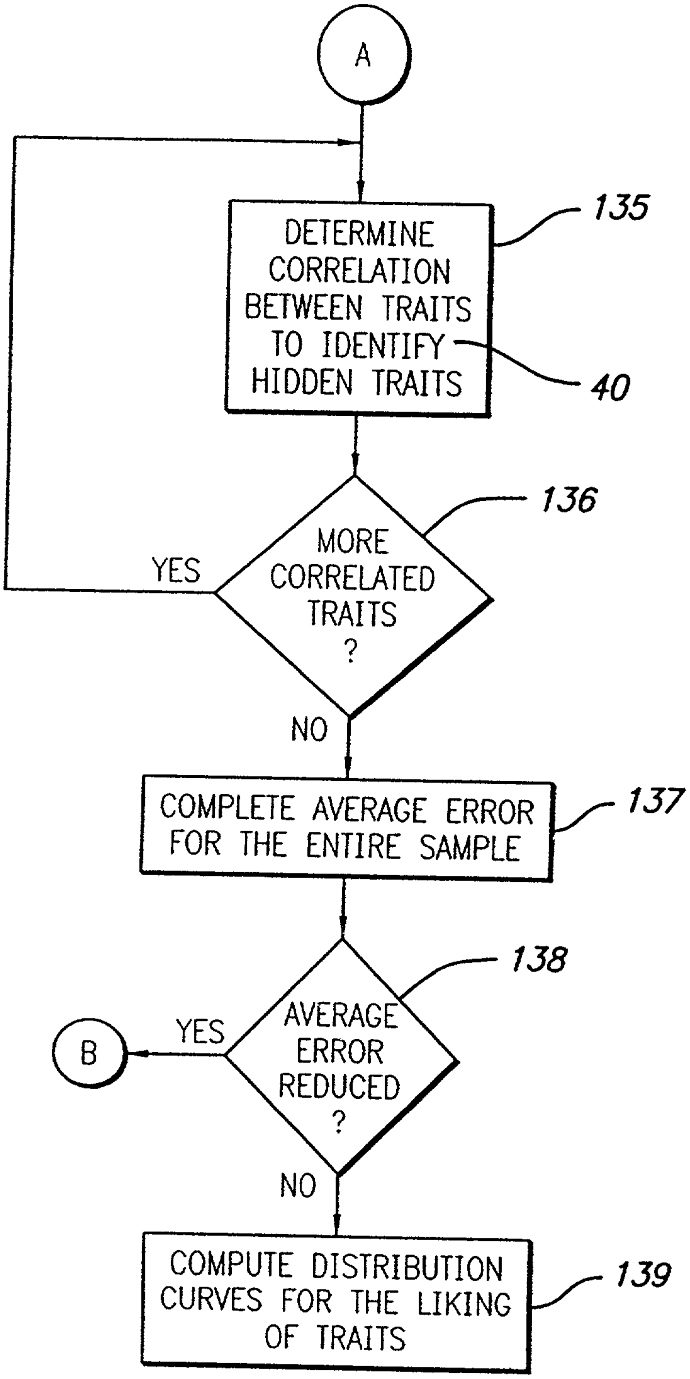

A
DETERMINE CORRELATION BETWEEN TRAITS TO IDENTIFY HIDDEN TRAITS
135
40
MORE CORRELATED TRAITS ?
136
YES
NO
COMPLETE AVERAGE ERROR FOR THE ENTIRE SAMPLE
137
AVERAGE ERROR REDUCED ?
138
YES
B
NO
COMPUTE DISTRIBUTION CURVES FOR THE LIKING OF TRAITS
139

FIG. 5B

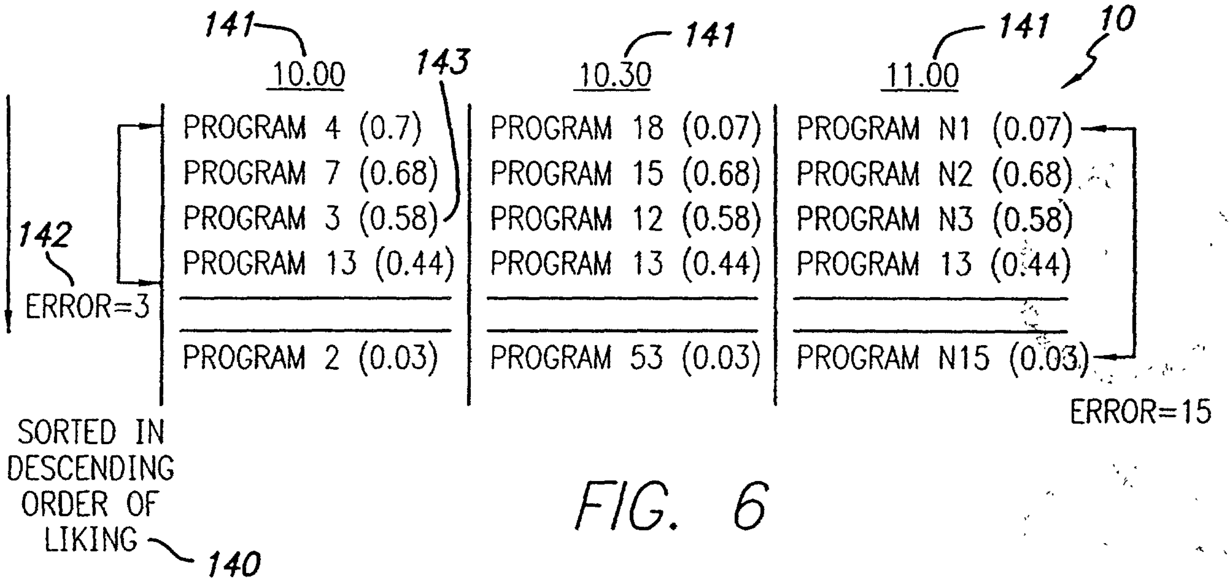

141
10.00
143
141
10.30
141
11.00
10
PROGRAM 4 (0.7)
PROGRAM 7 (0.68)
PROGRAM 3 (0.58)
PROGRAM 13 (0.44)
PROGRAM 2 (0.03)
PROGRAM 18 (0.07)
PROGRAM 15 (0.68)
PROGRAM 12 (0.58)
PROGRAM 13 (0.44)
PROGRAM 53 (0.03)
PROGRAM N1 (0.07)
PROGRAM N2 (0.68)
PROGRAM N3 (0.58)
PROGRAM 13 (0.44)
PROGRAM N15 (0.03)
142
ERROR=3
ERROR=15
SORTED IN DESCENDING ORDER OF LIKING
140

FIG. 6

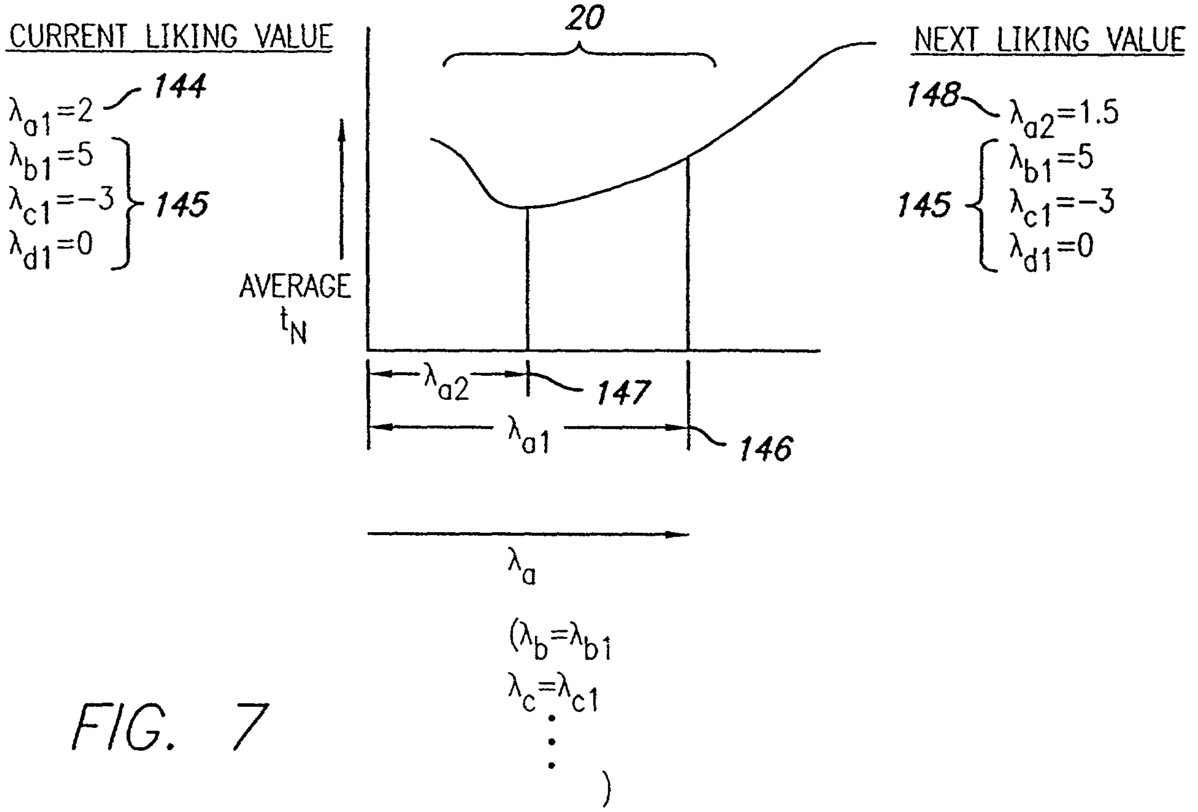
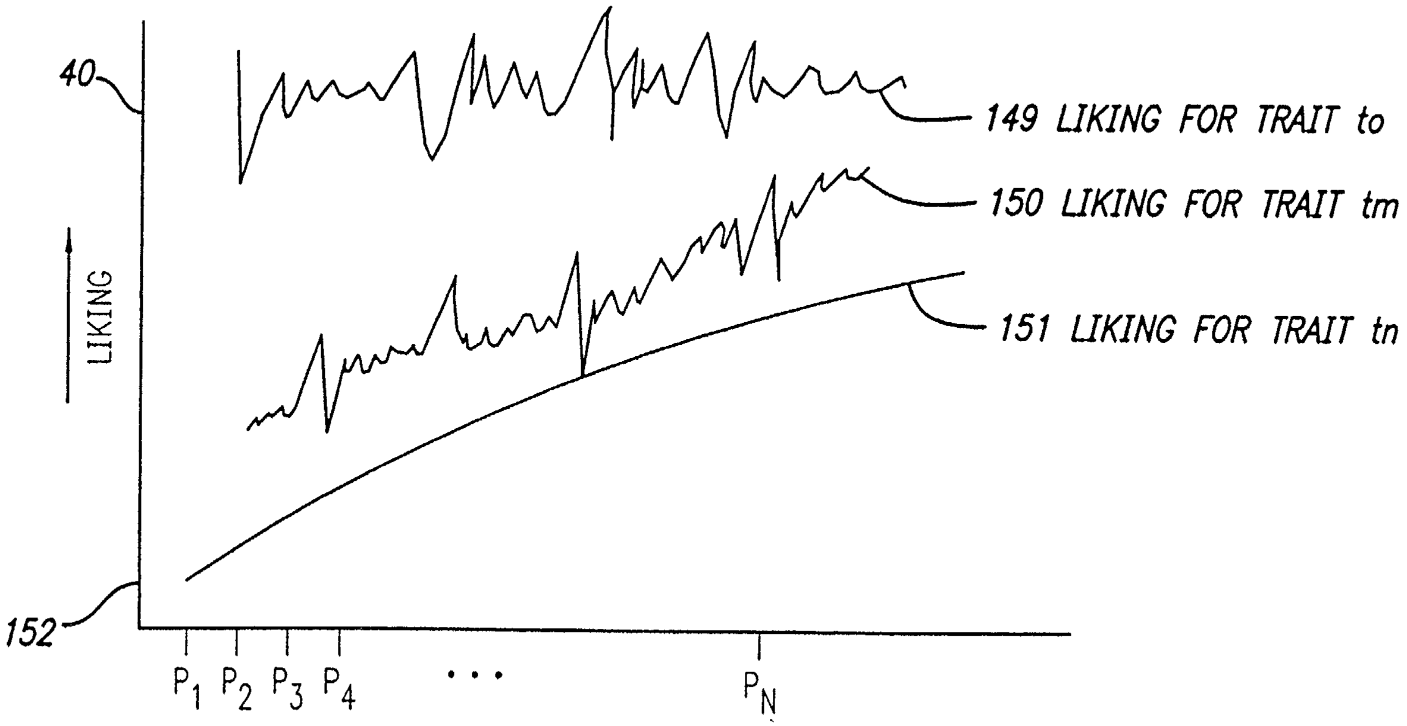

CURRENT LIKING VALUE
$\lambda_{a1}=2$
144
$\lambda_{b1}=5$
$\lambda_{c1}=-3$
$\lambda_{d1}=0$
145
20
NEXT LIKING VALUE
148
$\lambda_{a2}=1.5$
145
$\lambda_{b1}=5$
$\lambda_{c1}=-3$
$\lambda_{d1}=0$
AVERAGE t_N
λ_{a2}
147
λ_{a1}
146
λ_a
$(\lambda_b=\lambda_{b1}$
$\lambda_c=\lambda_{c1}$
$\vdots$
$)$

FIG. 7

RECOGNIZE HIDDEN TRAITS IN PROGRAMS



t_m & t_n ARE CORRELATED

→ t_m CAN BE EXPRESSED AS $t_m = t_x + t_m'$

t_n CAN BE EXPRESSED AS $t_n = Ct_x + t_n'$

FIG. 8

FIG. 9A COMPUTING TRAITNESS OF A TRAIT IN A PROGRAM

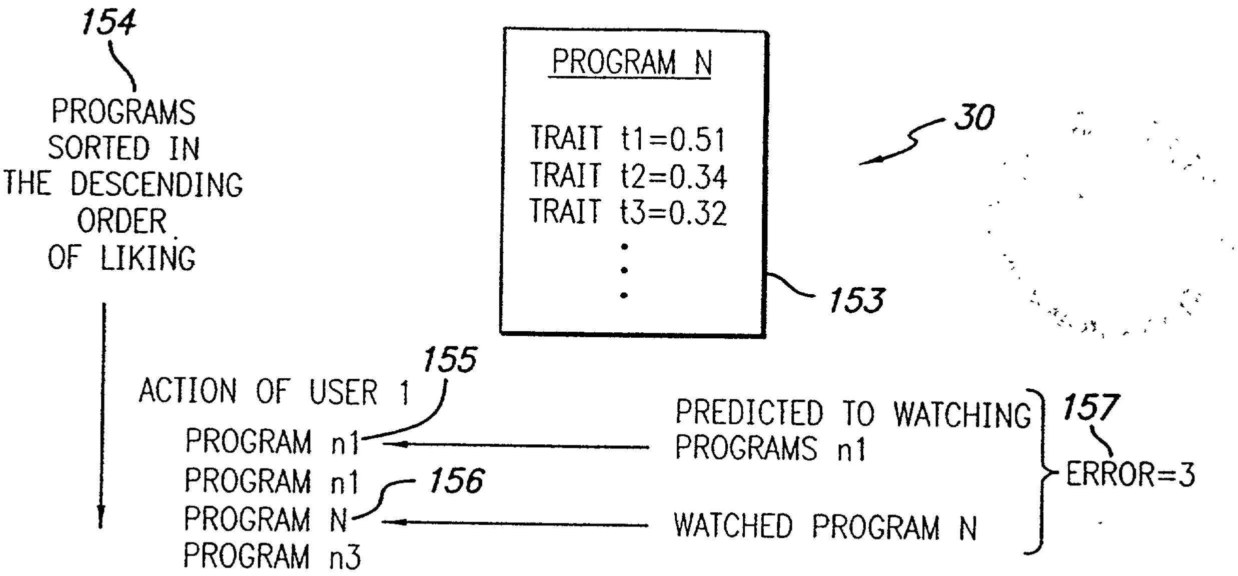
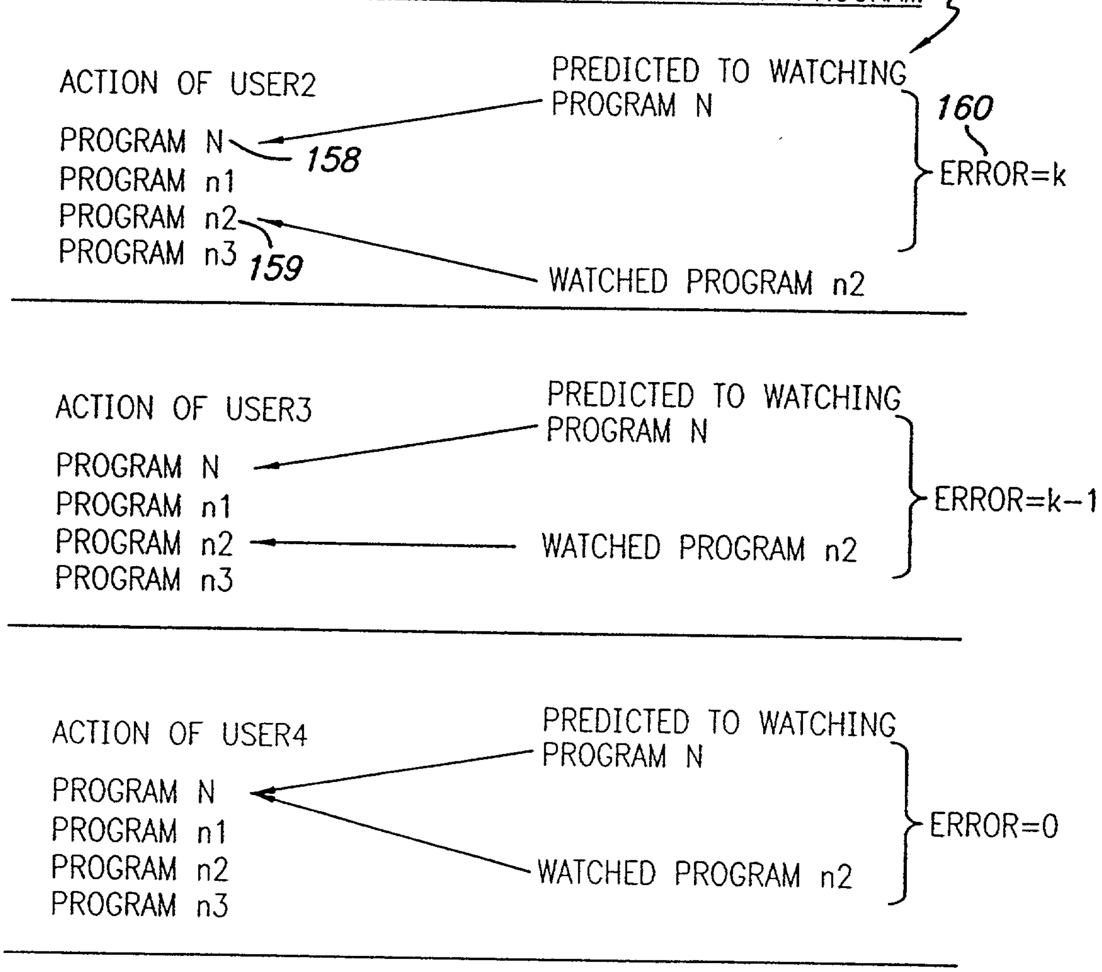
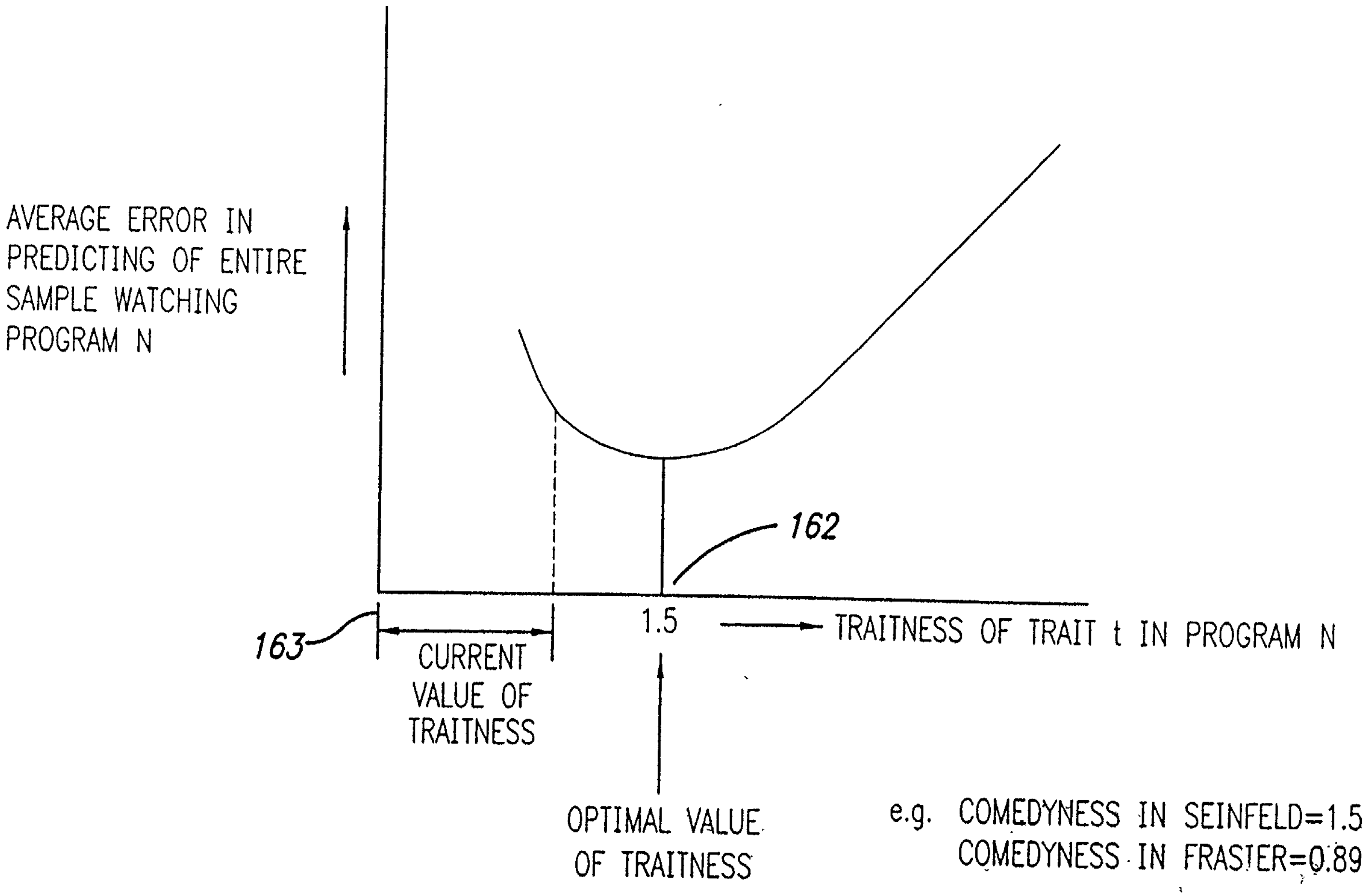


FIG. 9B COMPUTING TRAITNESS OF A TRAIT IN A PROGRAM



COMPUTING TRAITNESS OF A TRAIT IN A PROGRAM



e.g. COMEDYNESS IN SEINFELD=1.5
COMEDYNESS IN FRASTER=0.89

FIG. 9C

FIG. 10

EXAMPLE FOR LIKING DISTRIBUTION RECORD FORMAT

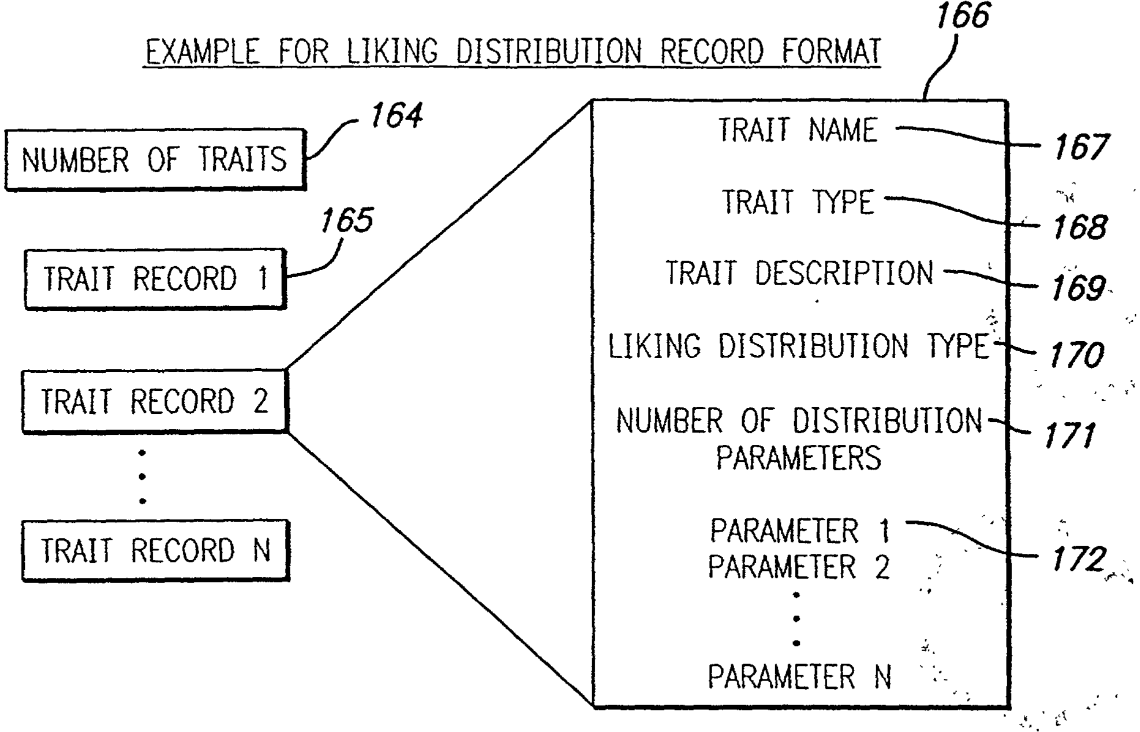


FIG. 12

EXAMPLE FOR TRAITNESS OF RECURRING PROGRAMS

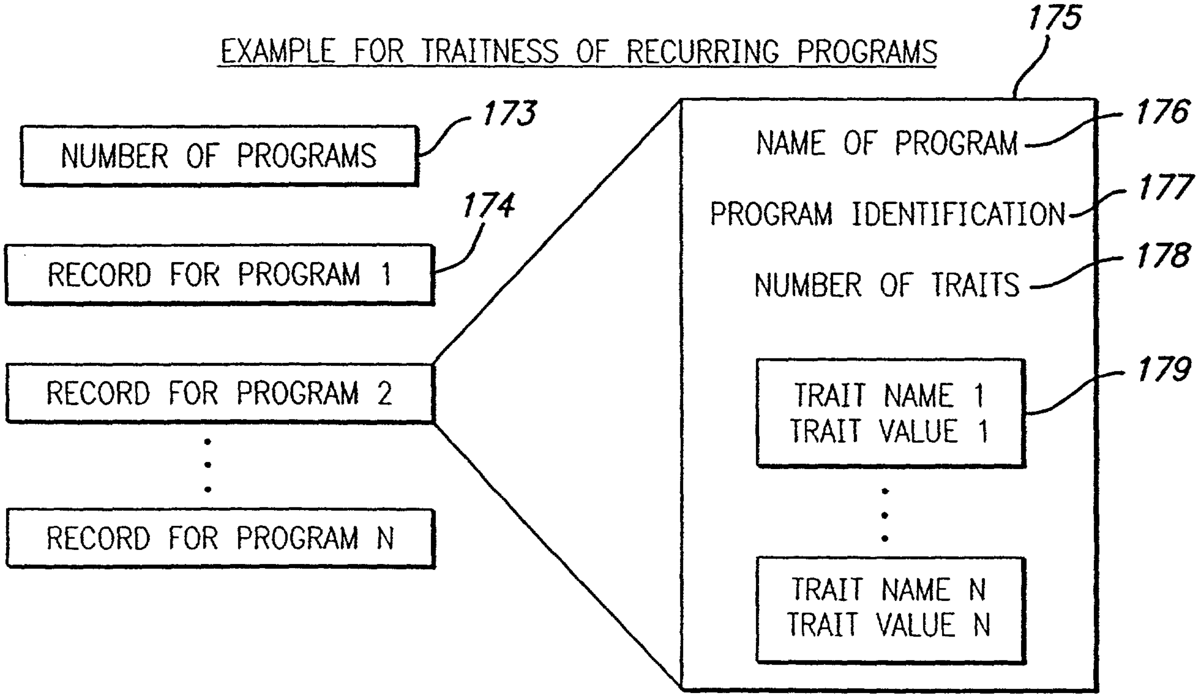


FIG. 13

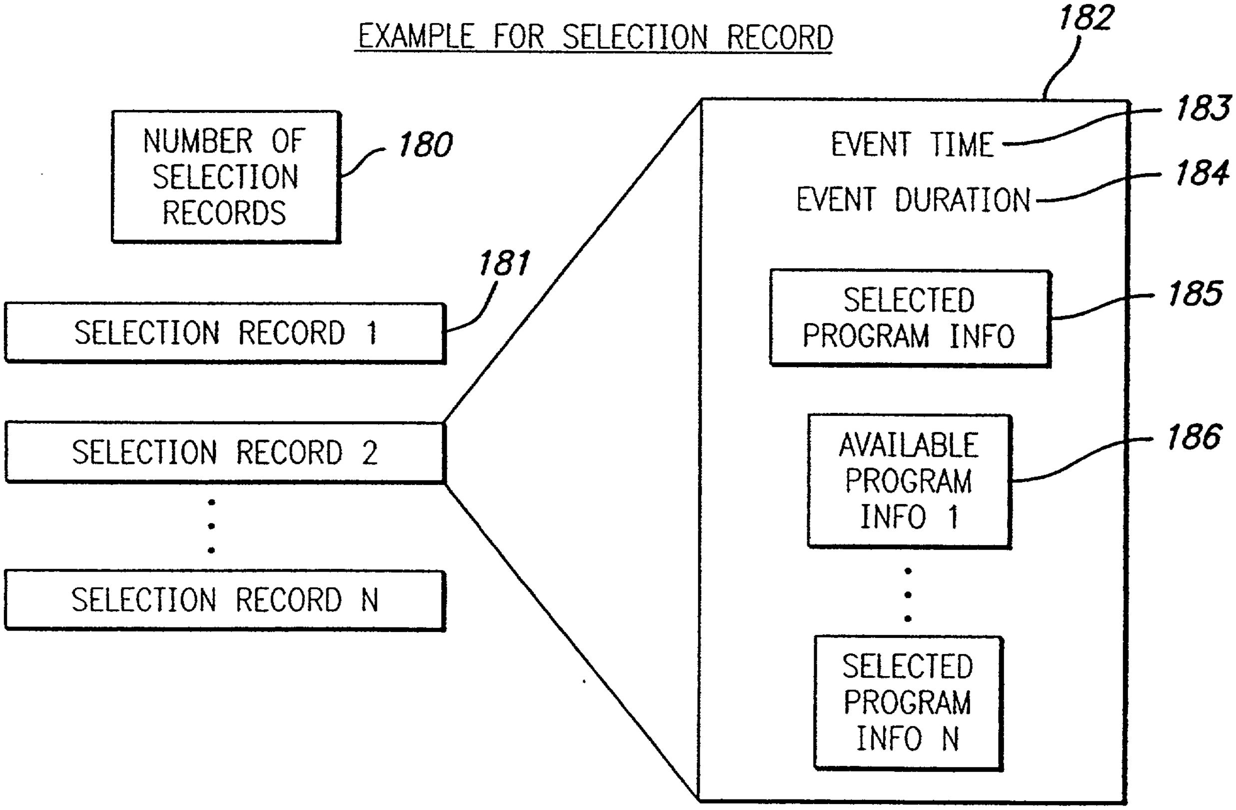
EXAMPLE FOR BROADCASTING TRAITNESS AS A PART OF EPG DATA

PROGRAM INFO

SEINFELD,
NBC,
COMEDY=0.07
SITCOM,
DYNAMIC TRAIT 1=0.1
⋮
ACTOR=SEINFELD

FIG. 14

EXAMPLE FOR SELECTION RECORD



GENERATION OF USER SELECTION HISTORY

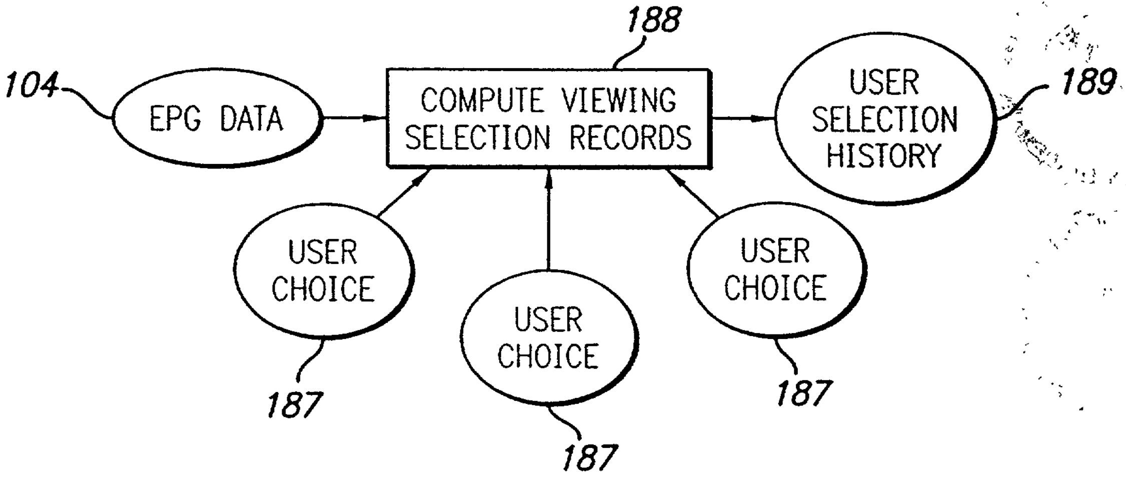


FIG. 15

COMPUTING RELEVANCE

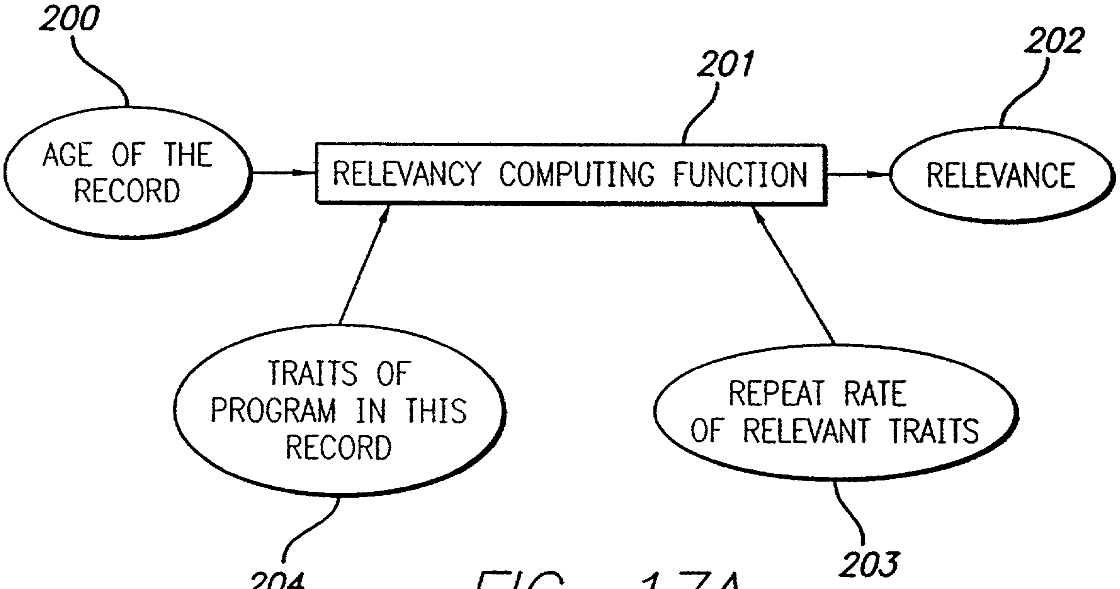
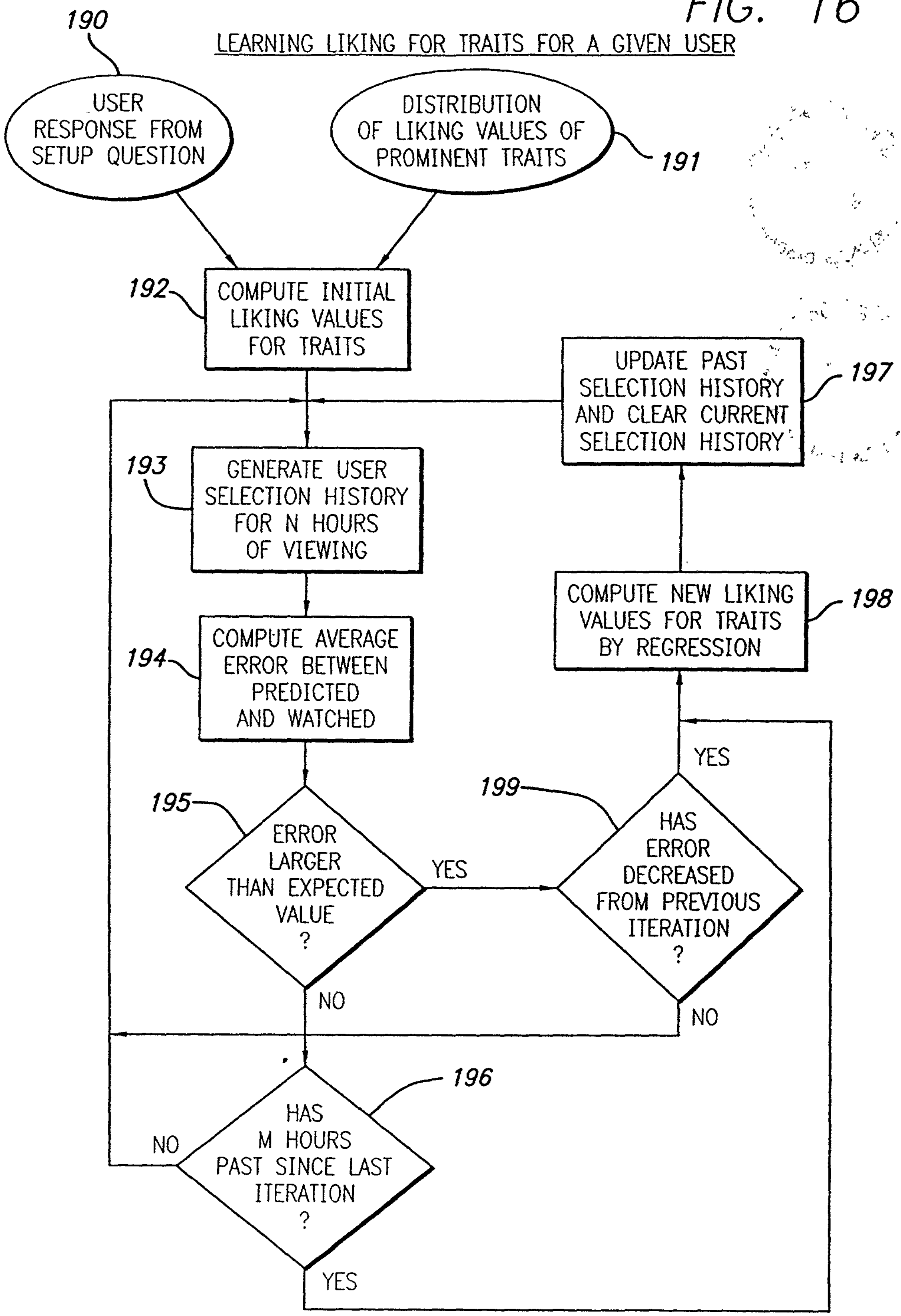


FIG. 17A

FIG. 16

LEARNING LIKING FOR TRAITS FOR A GIVEN USER



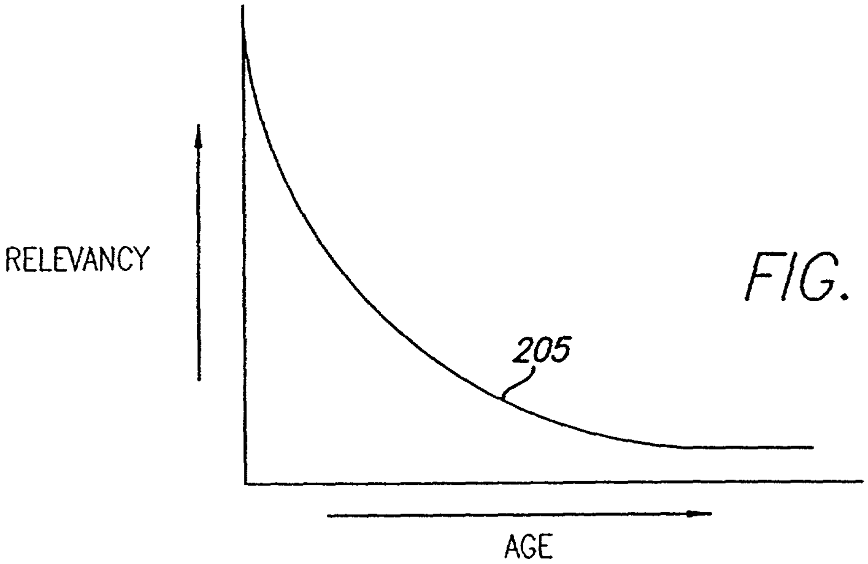


FIG. 17B

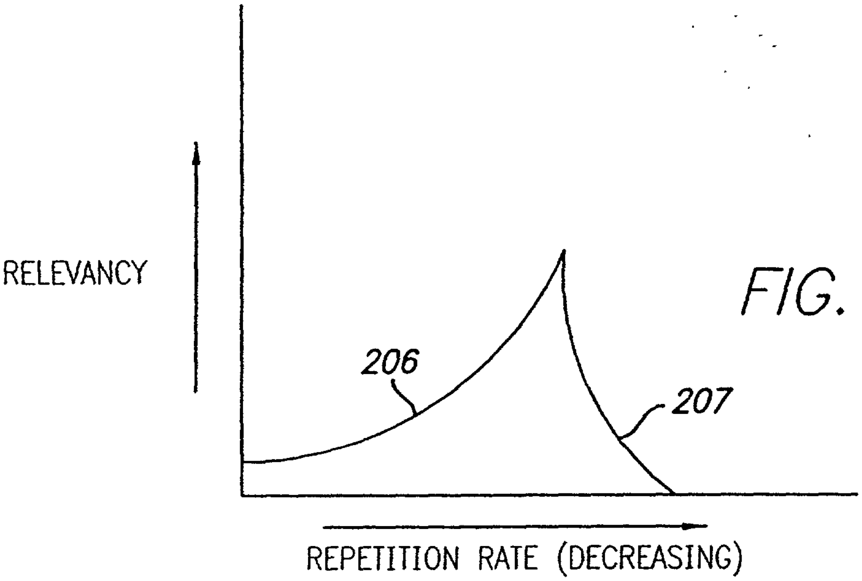


FIG. 17C

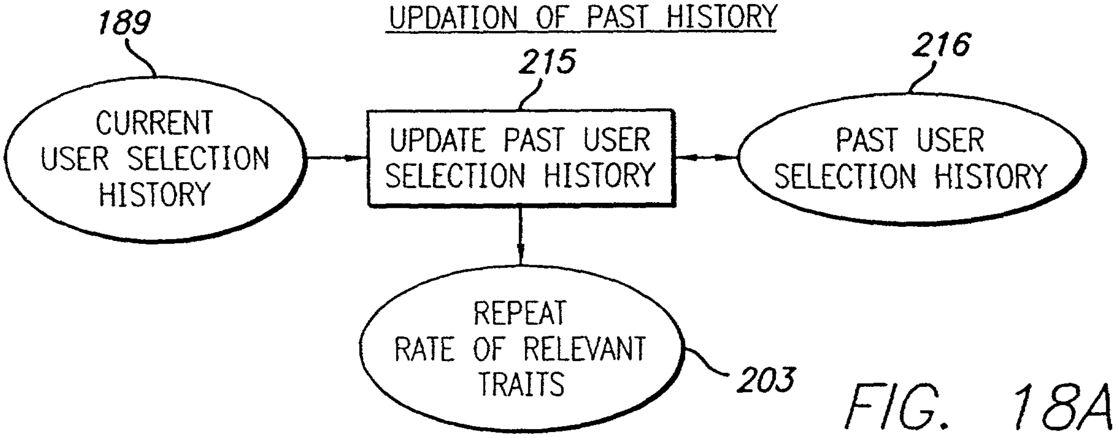


FIG. 18A

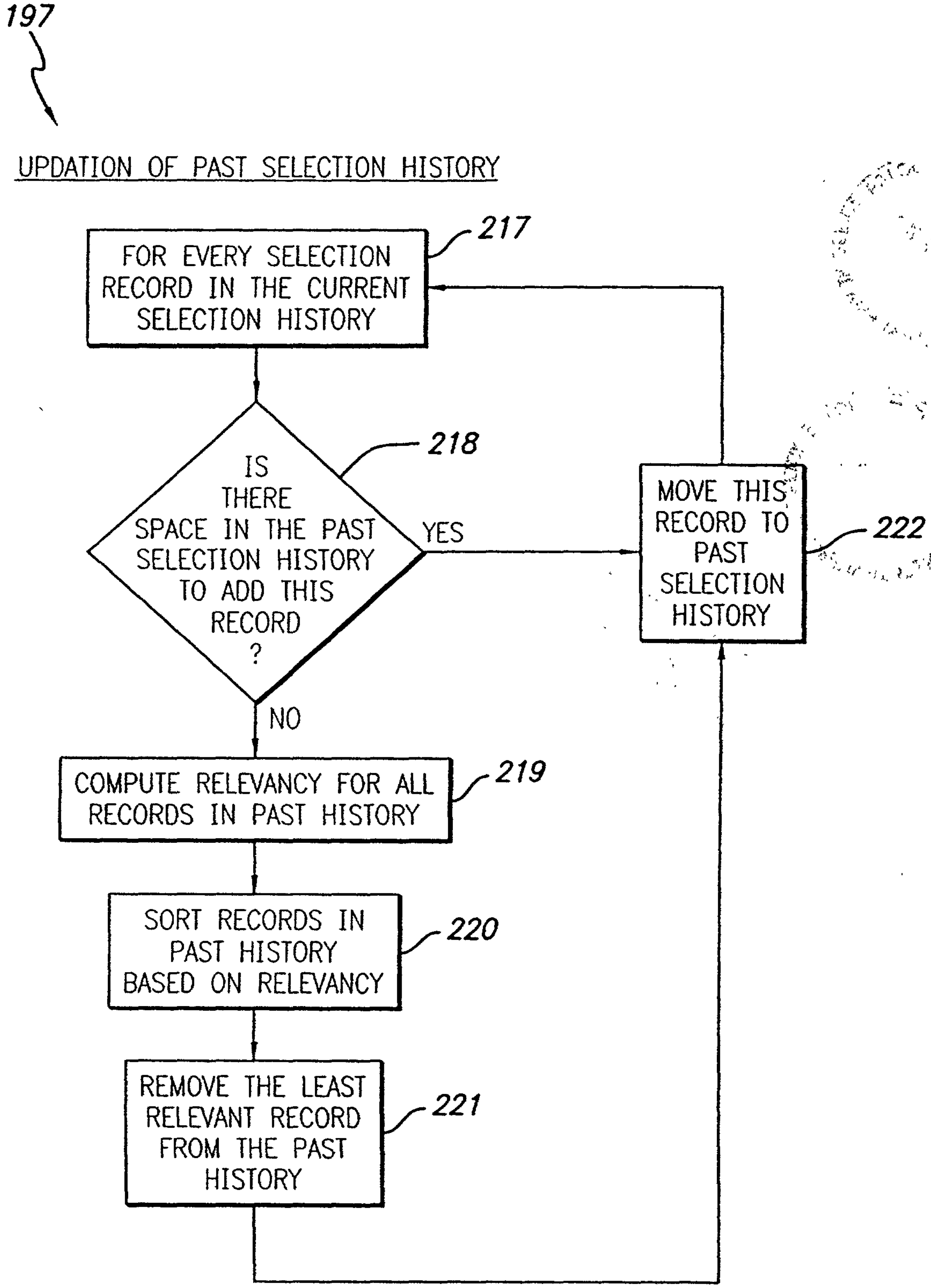

197
UPDATION OF PAST SELECTION HISTORY
FOR EVERY SELECTION RECORD IN THE CURRENT SELECTION HISTORY
217
IS THERE SPACE IN THE PAST SELECTION HISTORY TO ADD THIS RECORD ?
218
YES
NO
MOVE THIS RECORD TO PAST SELECTION HISTORY
222
COMPUTE RELEVANCY FOR ALL RECORDS IN PAST HISTORY
219
SORT RECORDS IN PAST HISTORY BASED ON RELEVANCY
220
REMOVE THE LEAST RELEVANT RECORD FROM THE PAST HISTORY
221

FIG. 18B

COMPUTING LIKING ON CLIENTSIDE

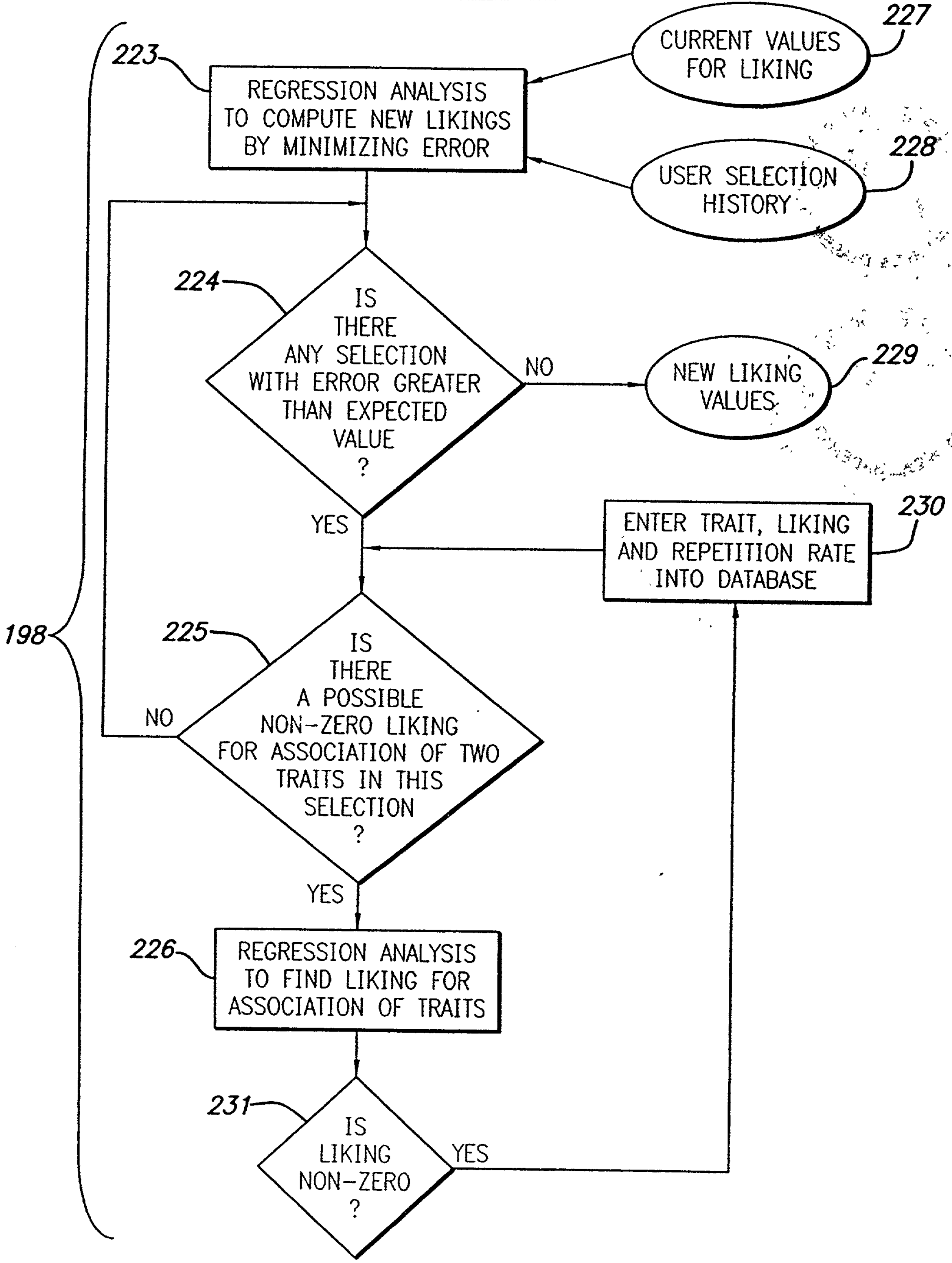


FIG. 19

COMPUTING SCORES FOR PROGRAMS FOR FUTURE PREDICTION

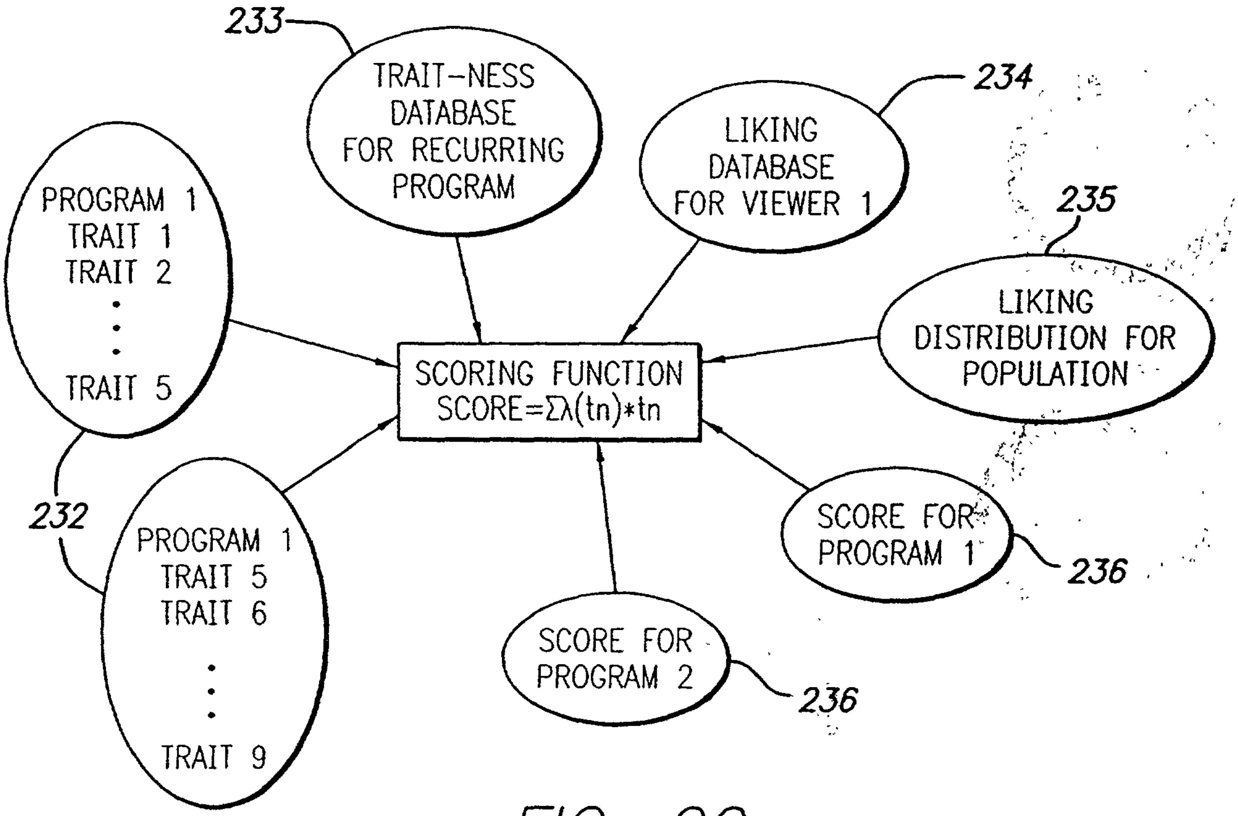


FIG. 20

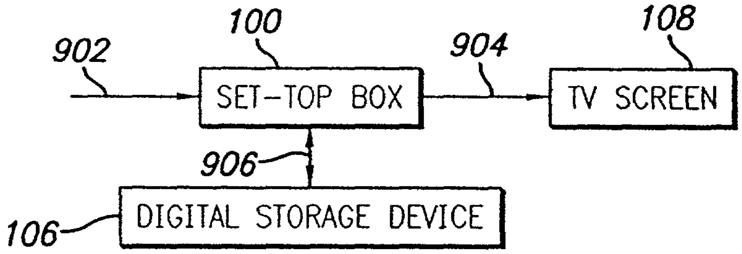


FIG. 26A

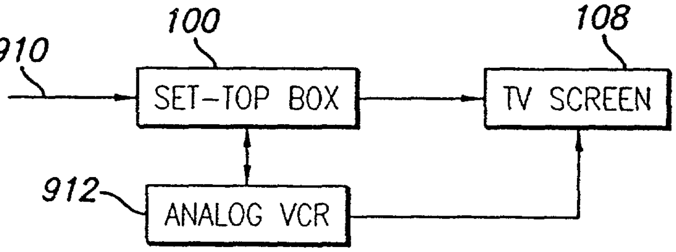


FIG. 26B

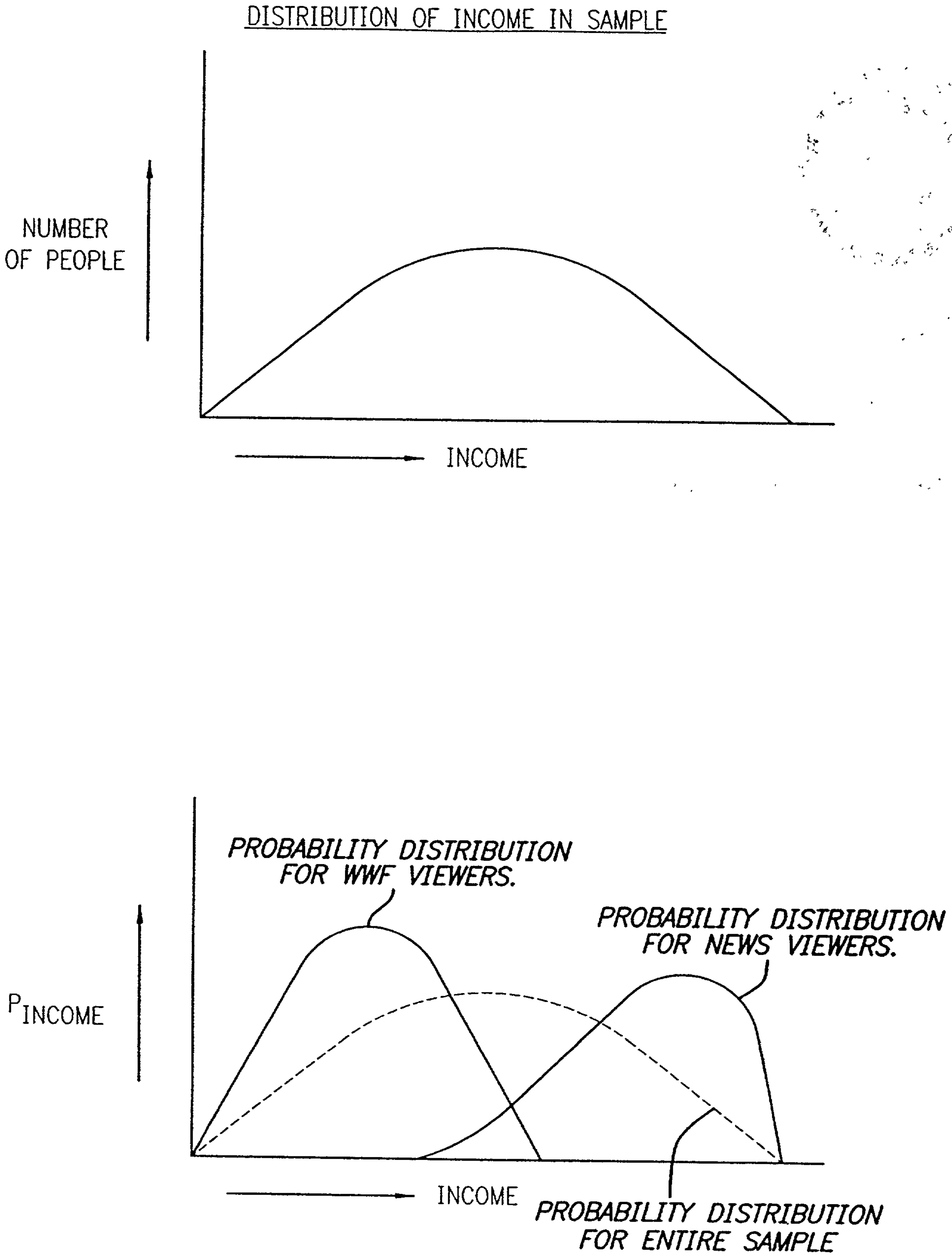

DISTRIBUTION OF INCOME IN SAMPLE
NUMBER OF PEOPLE
INCOME
PROBABILITY DISTRIBUTION FOR WWF VIEWERS.
PROBABILITY DISTRIBUTION FOR NEWS VIEWERS.
P_{INCOME}
INCOME
PROBABILITY DISTRIBUTION FOR ENTIRE SAMPLE

FIG. 21A

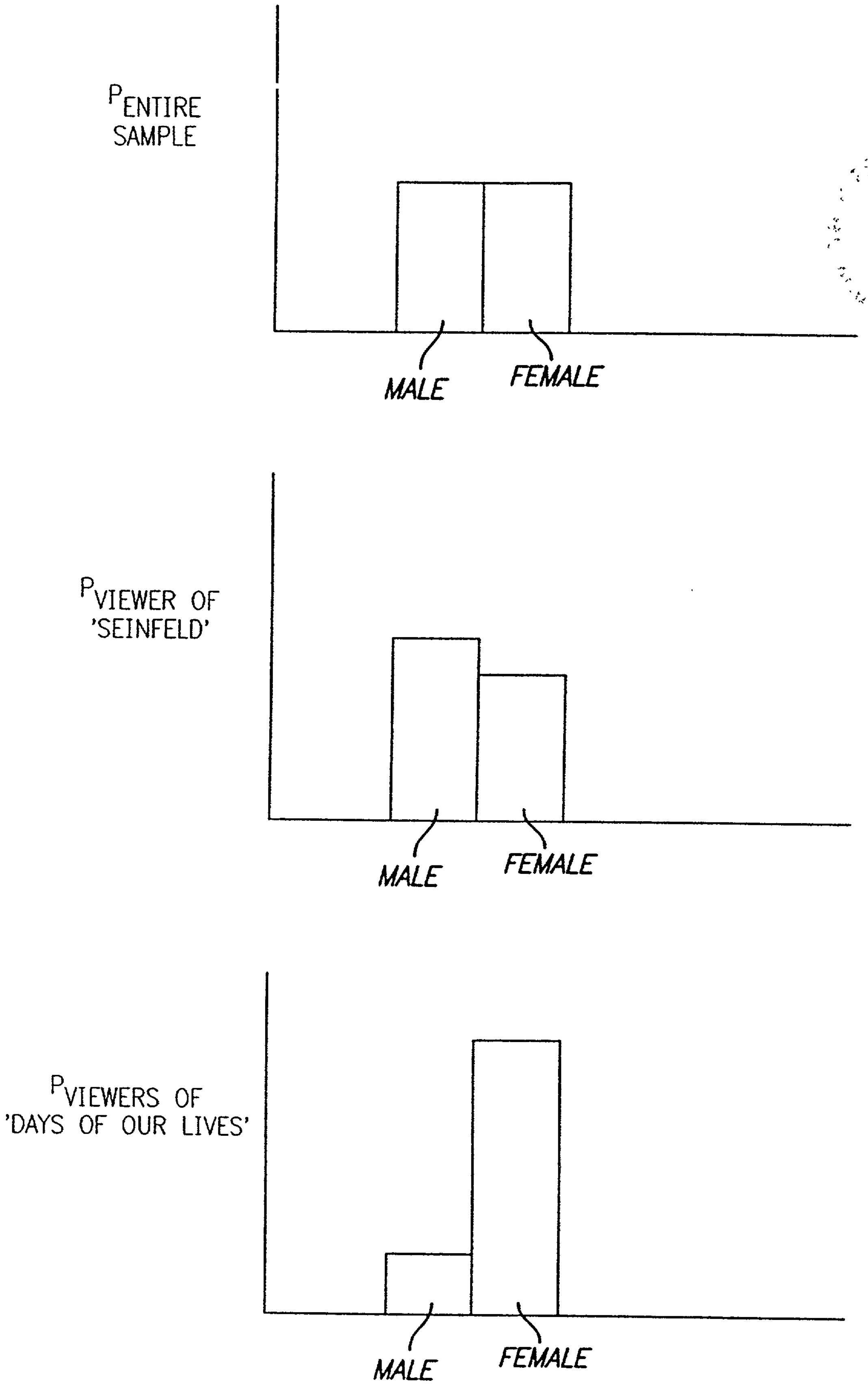

$P_{\text{ENTIRE SAMPLE}}$
MALE
FEMALE
$P_{\text{VIEWER OF 'SEINFELD'}}$
MALE
FEMALE
$P_{\text{VIEWERS OF 'DAYS OF OUR LIVES'}}$
MALE
FEMALE

FIG. 21B

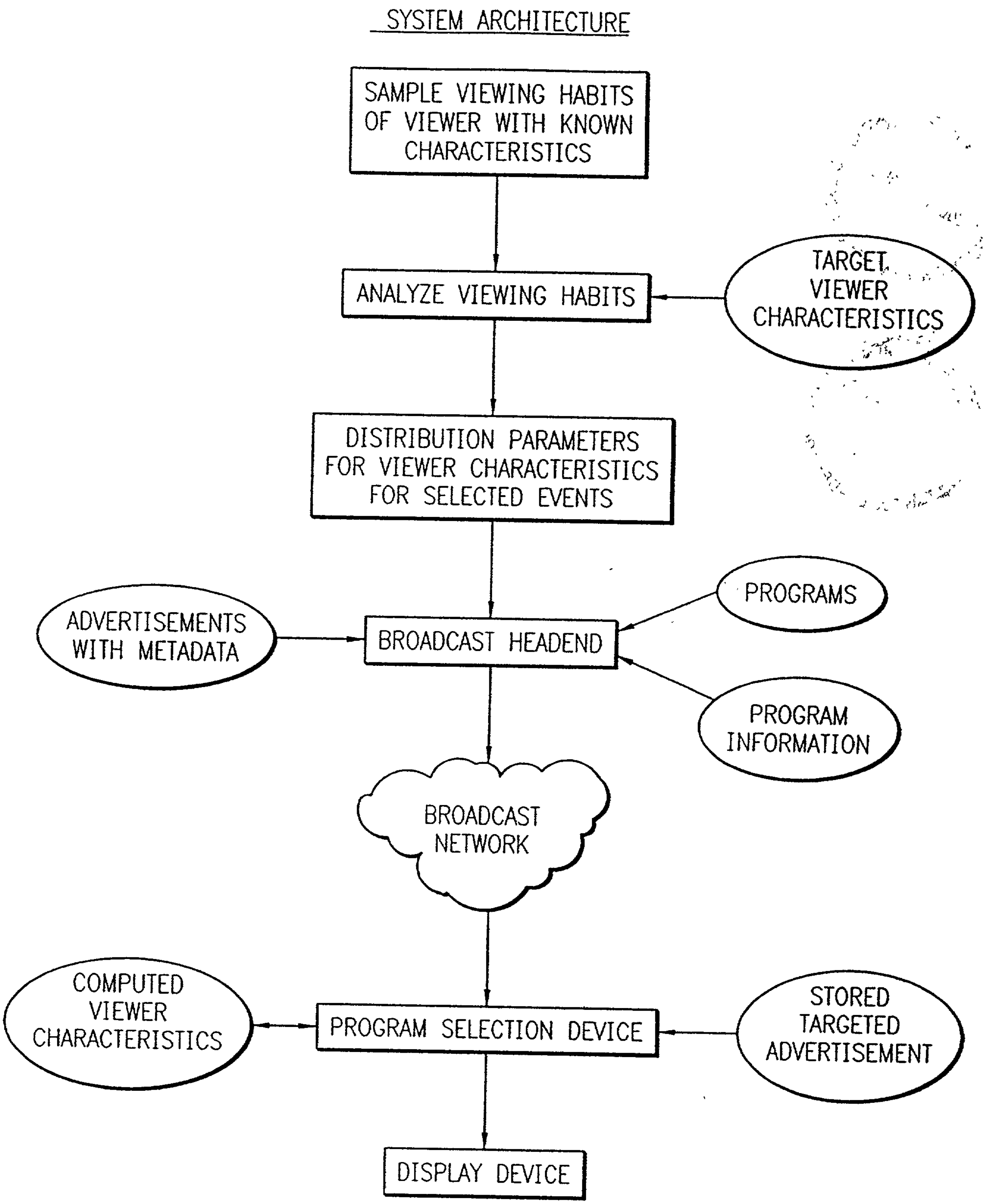

SYSTEM ARCHITECTURE
SAMPLE VIEWING HABITS OF VIEWER WITH KNOWN CHARACTERISTICS
ANALYZE VIEWING HABITS
TARGET VIEWER CHARACTERISTICS
DISTRIBUTION PARAMETERS FOR VIEWER CHARACTERISTICS FOR SELECTED EVENTS
ADVERTISEMENTS WITH METADATA
BROADCAST HEADEND
PROGRAMS
PROGRAM INFORMATION
BROADCAST NETWORK
COMPUTED VIEWER CHARACTERISTICS
PROGRAM SELECTION DEVICE
STORED TARGETED ADVERTISEMENT
DISPLAY DEVICE

FIG. 22

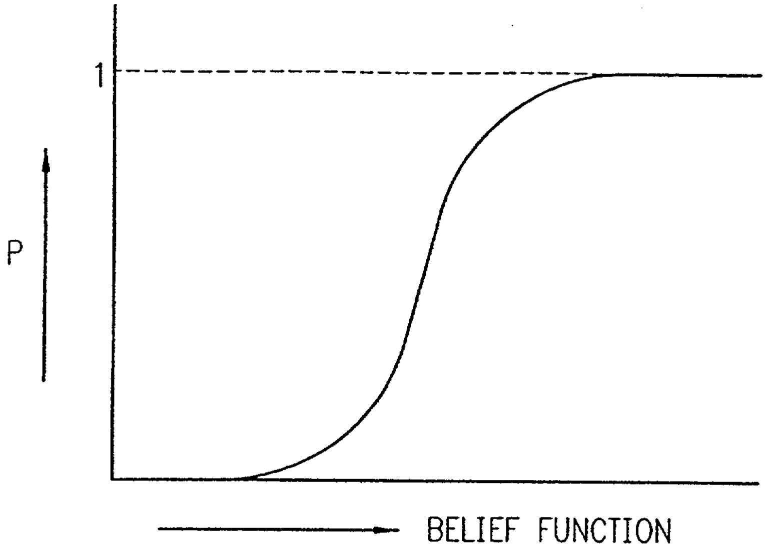


FIG. 23A

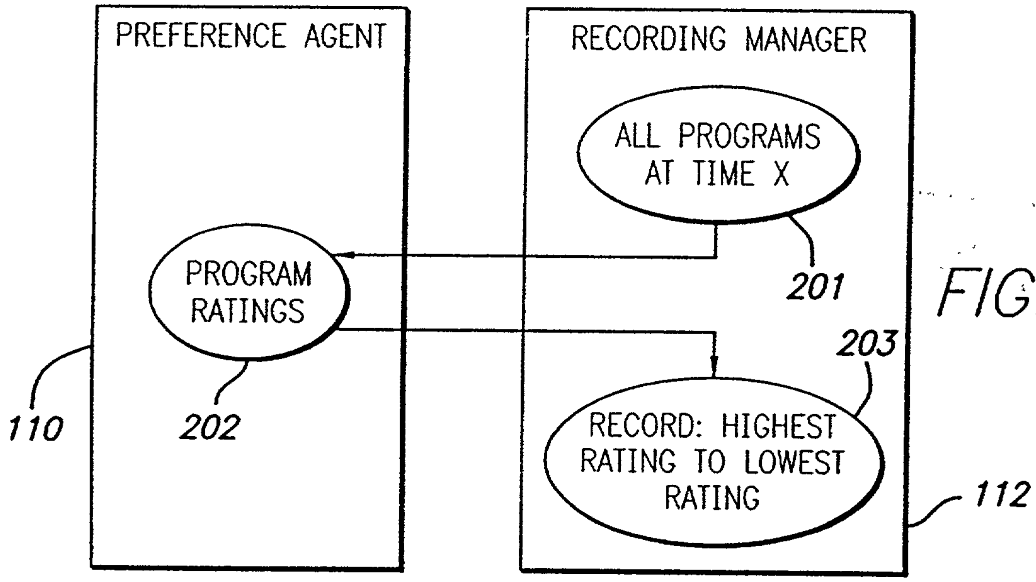


FIG. 24

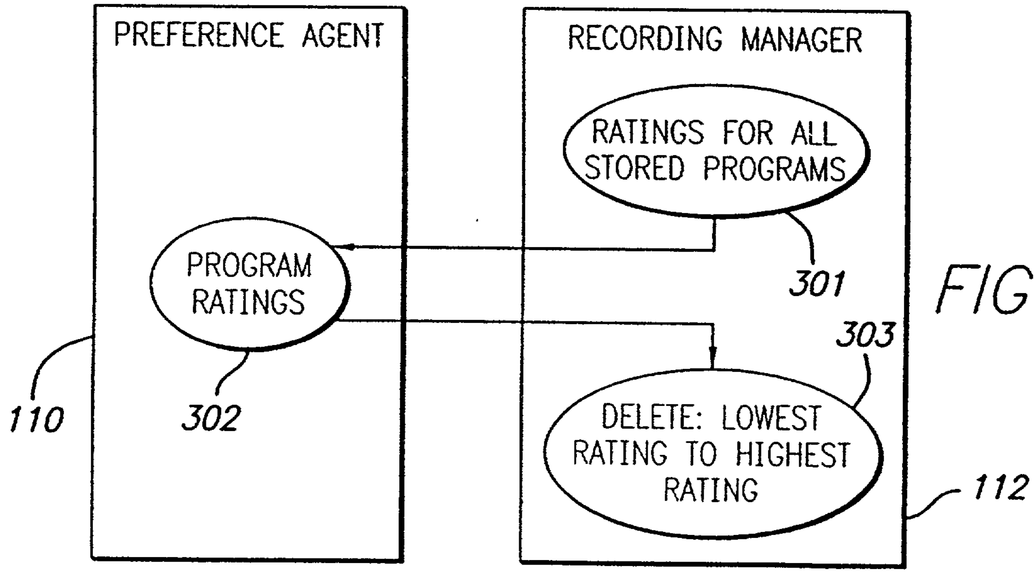


FIG. 25

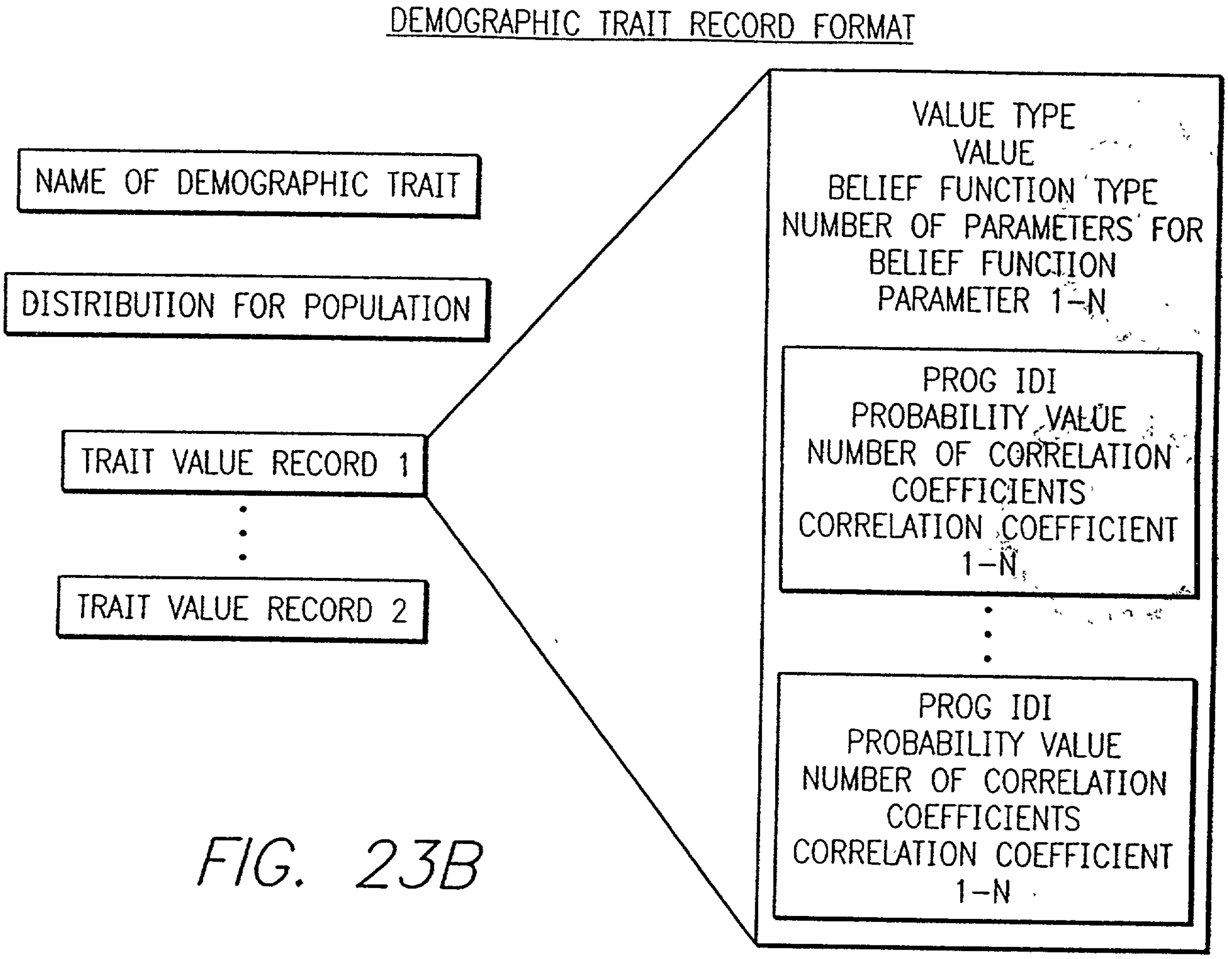


FIG. 23B

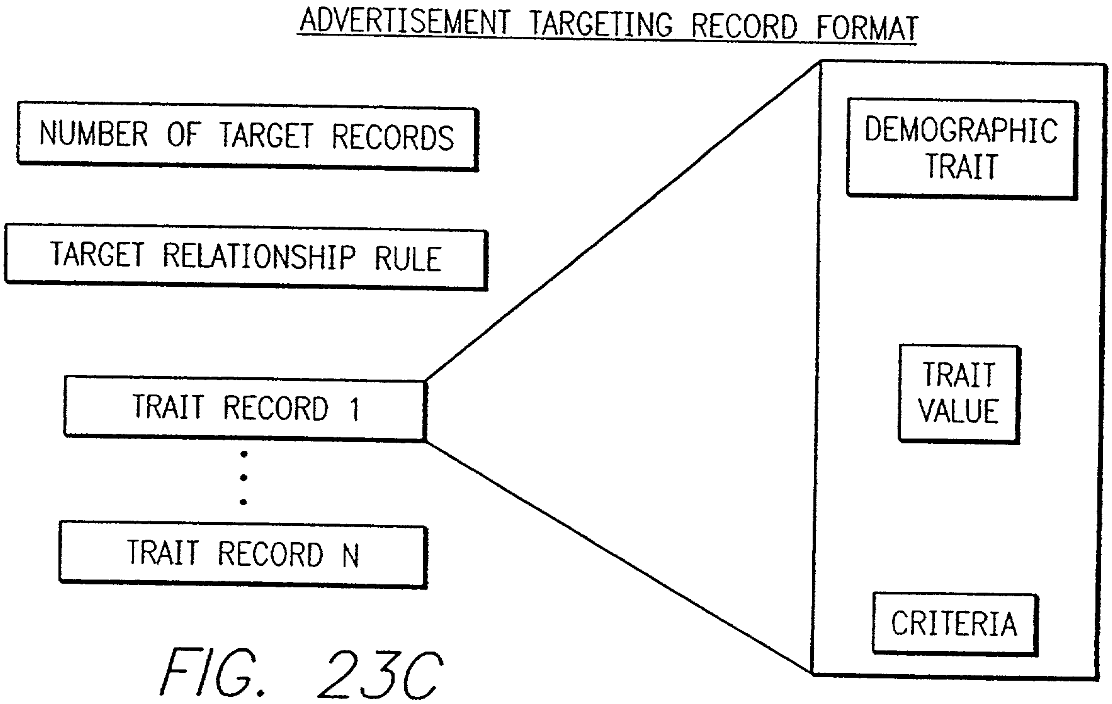


FIG. 23C

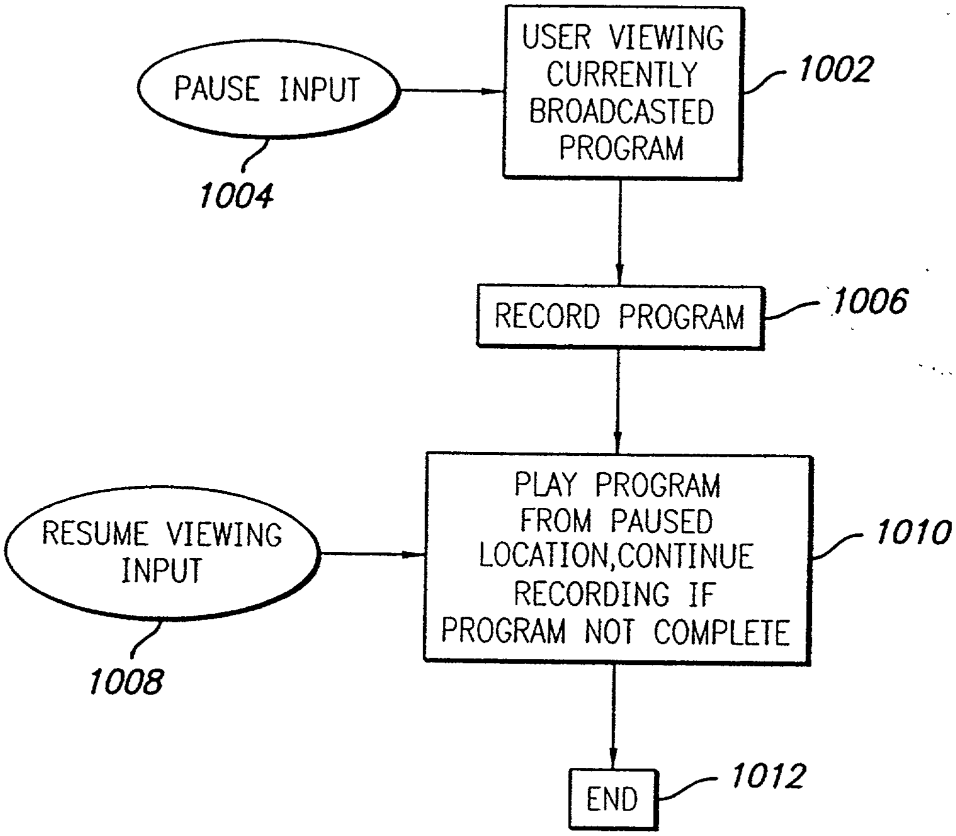

PAUSE INPUT
1004
USER VIEWING CURRENTLY BROADCASTED PROGRAM
1002
RECORD PROGRAM
1006
RESUME VIEWING INPUT
1008
PLAY PROGRAM FROM PAUSED LOCATION,CONTINUE RECORDING IF PROGRAM NOT COMPLETE
1010
END
1012

FIG. 27

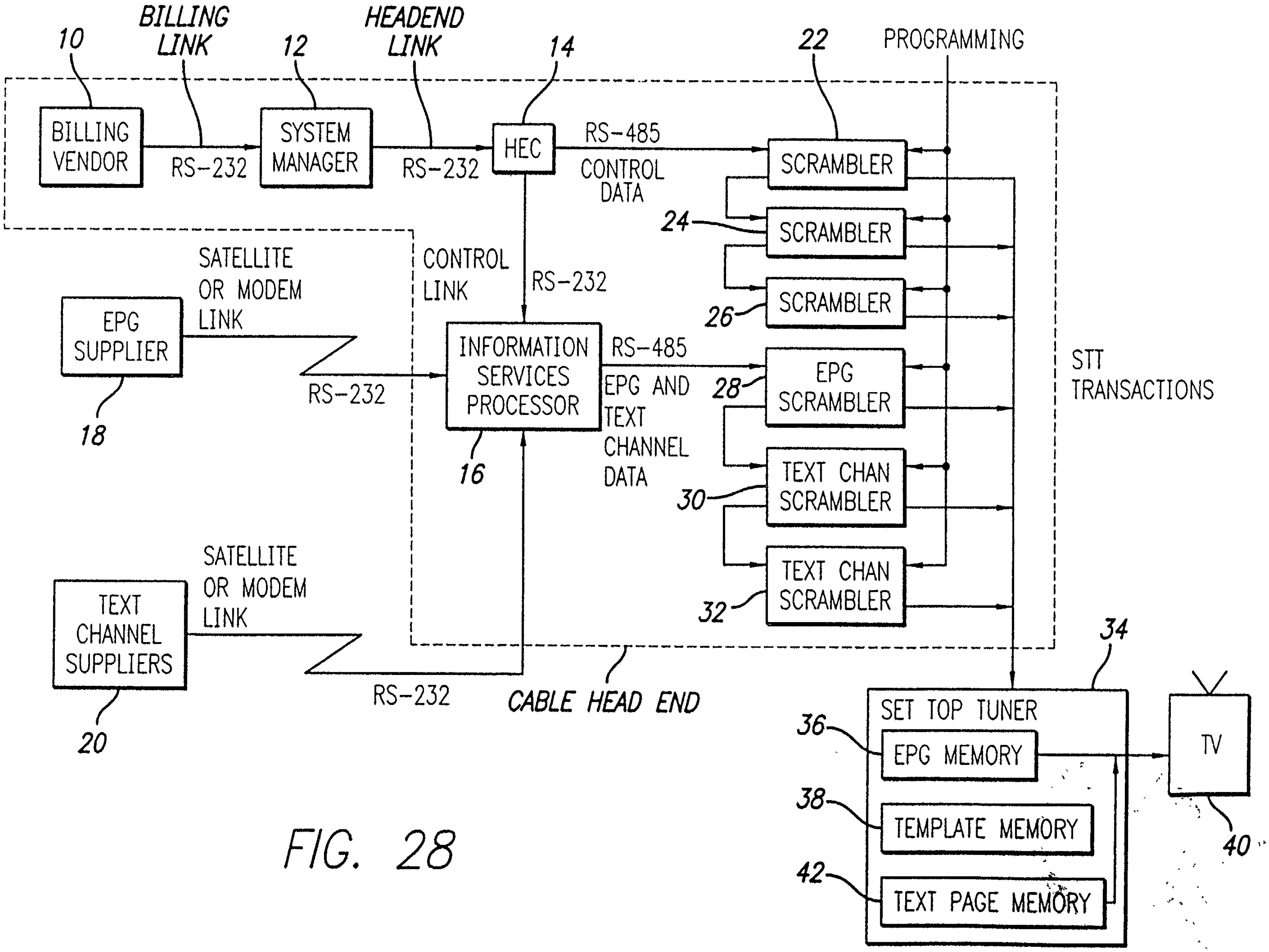
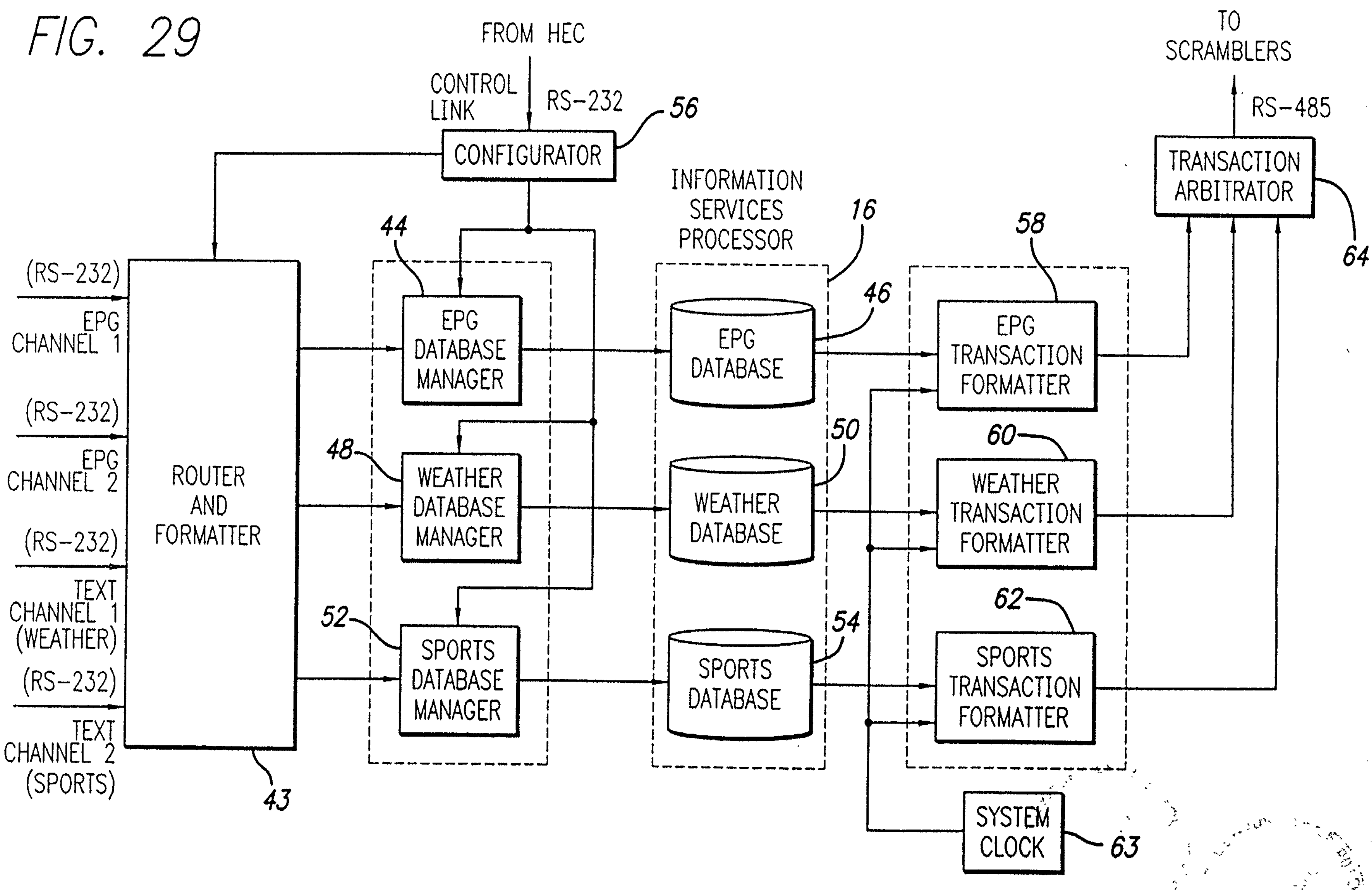

10
BILLING LINK
12
HEADEND LINK
14
22
PROGRAMMING
BILLING VENDOR
RS-232
SYSTEM MANAGER
RS-232
HEC
RS-485
CONTROL DATA
SCRAMBLER
24
SCRAMBLER
26
SCRAMBLER
SATELLITE OR MODEM LINK
CONTROL LINK
RS-232
EPG SUPPLIER
RS-232
INFORMATION SERVICES PROCESSOR
RS-485
EPG AND TEXT CHANNEL DATA
28
EPG SCRAMBLER
STT TRANSACTIONS
18
16
30
TEXT CHAN SCRAMBLER
SATELLITE OR MODEM LINK
TEXT CHANNEL SUPPLIERS
32
TEXT CHAN SCRAMBLER
34
RS-232
CABLE HEAD END
20
SET TOP TUNER
36
EPG MEMORY
TV
38
TEMPLATE MEMORY
40
42
TEXT PAGE MEMORY

FIG. 28

FIG. 29


FROM HEC
CONTROL LINK
RS-232
CONFIGURATOR
56
TO SCRAMBLERS
RS-485
TRANSACTION ARBITRATOR
64
INFORMATION SERVICES PROCESSOR
16
(RS-232)
EPG CHANNEL 1
(RS-232)
EPG CHANNEL 2
(RS-232)
TEXT CHANNEL 1 (WEATHER)
(RS-232)
TEXT CHANNEL 2 (SPORTS)
ROUTER AND FORMATTER
43
44
EPG DATABASE MANAGER
48
WEATHER DATABASE MANAGER
52
SPORTS DATABASE MANAGER
46
EPG DATABASE
50
WEATHER DATABASE
54
SPORTS DATABASE
58
EPG TRANSACTION FORMATTER
60
WEATHER TRANSACTION FORMATTER
62
SPORTS TRANSACTION FORMATTER
SYSTEM CLOCK
63

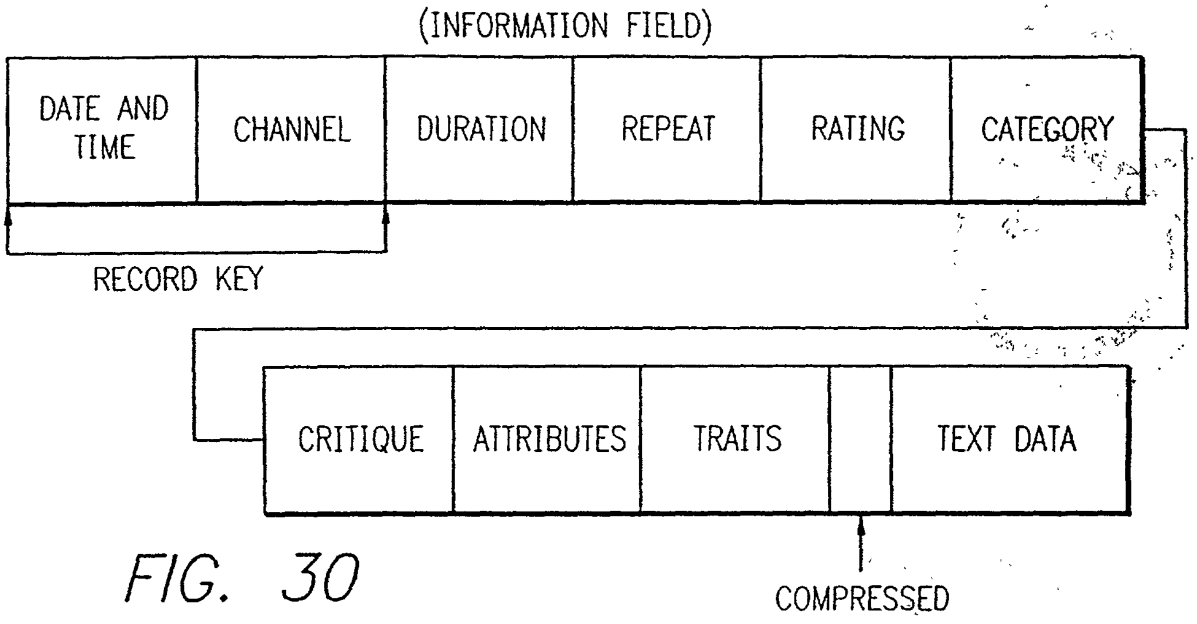


FIG. 30

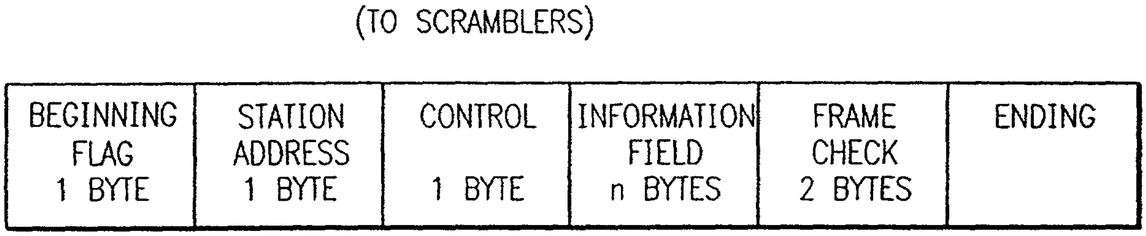


FIG. 31

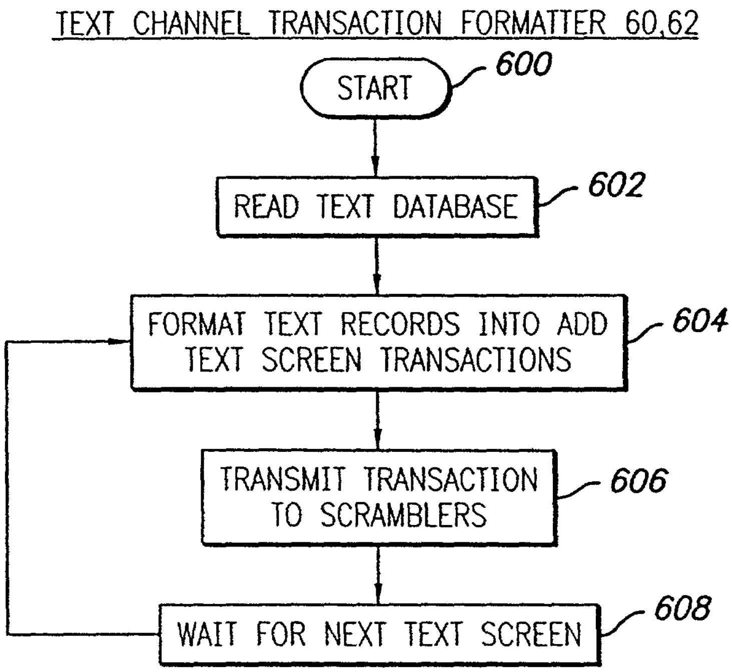


FIG. 33

EPG TRANSACTION FORMATTER 58

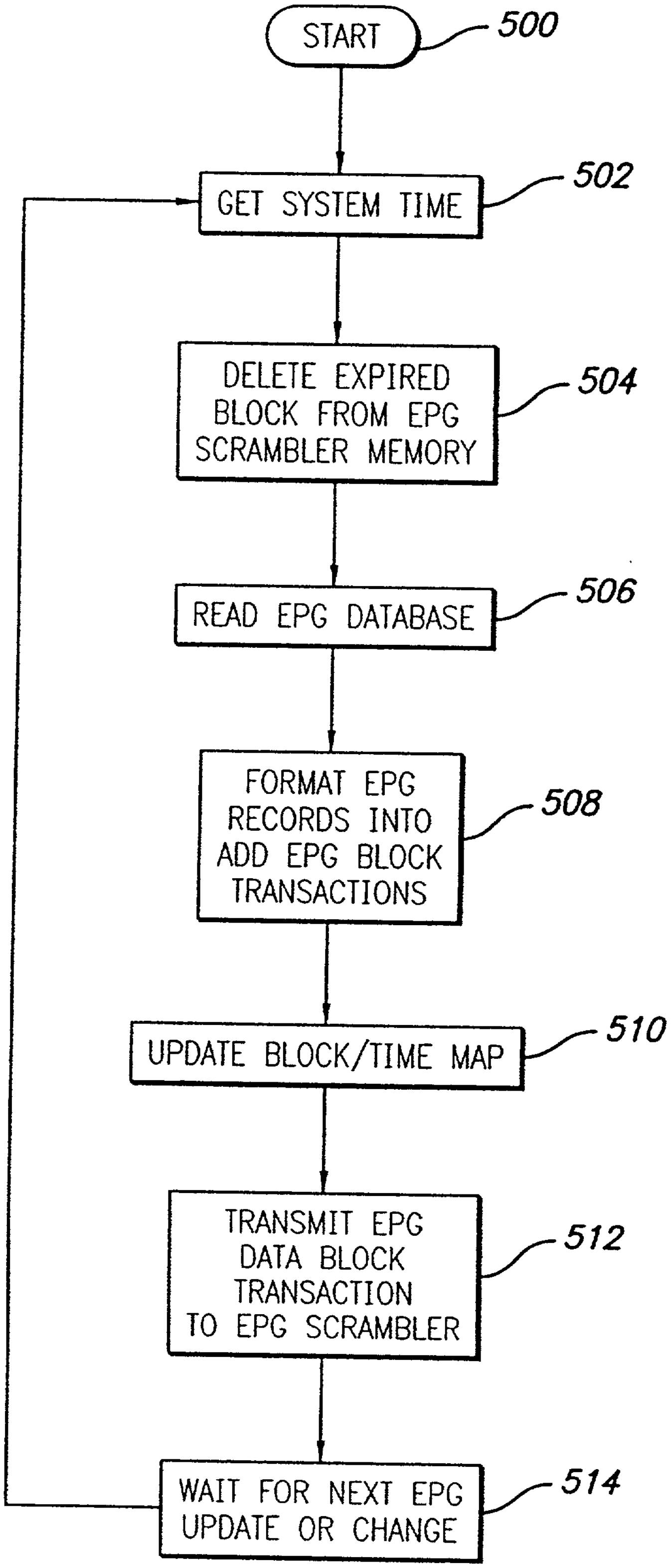
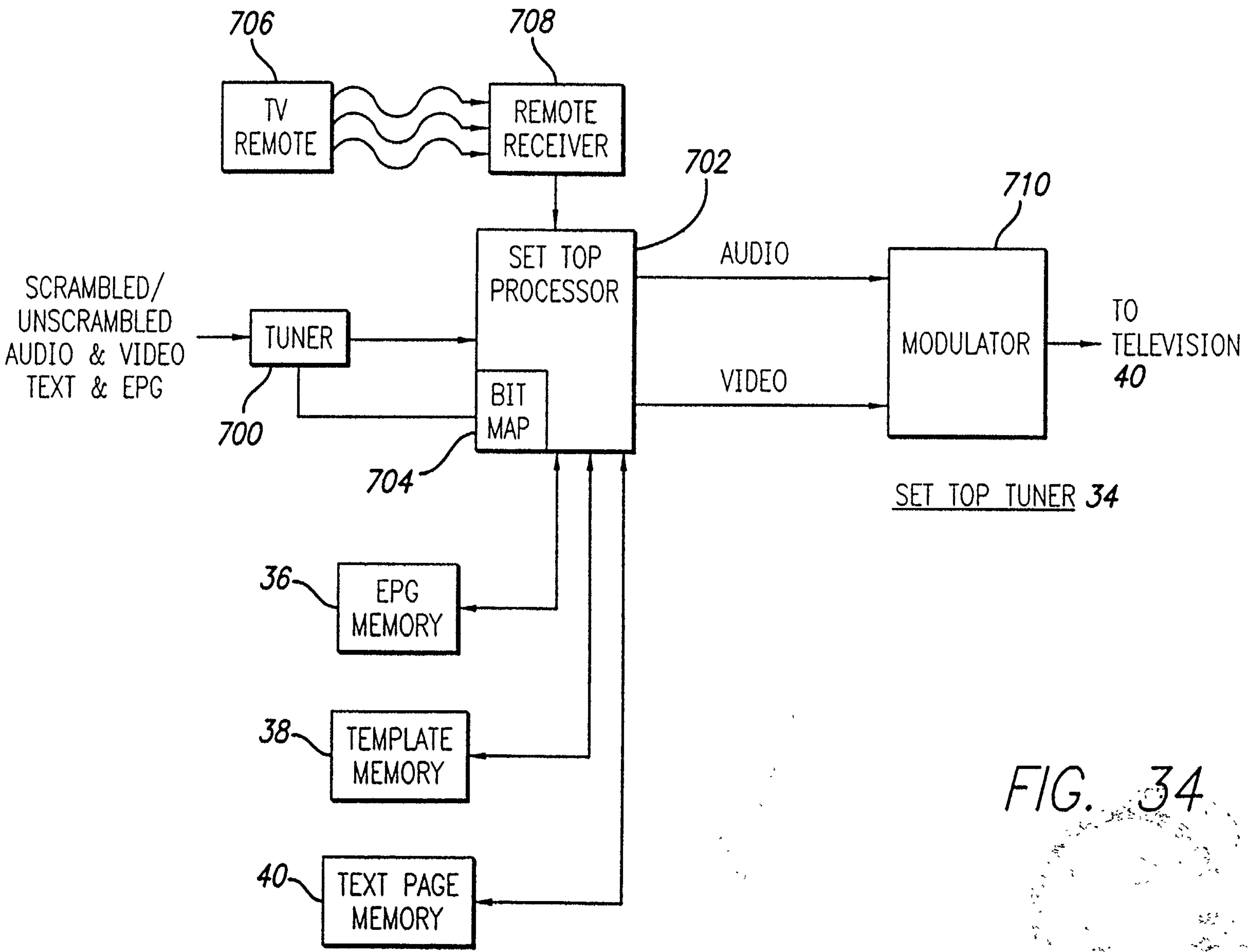


FIG. 32



SET TOP TUNER 34

FIG. 34

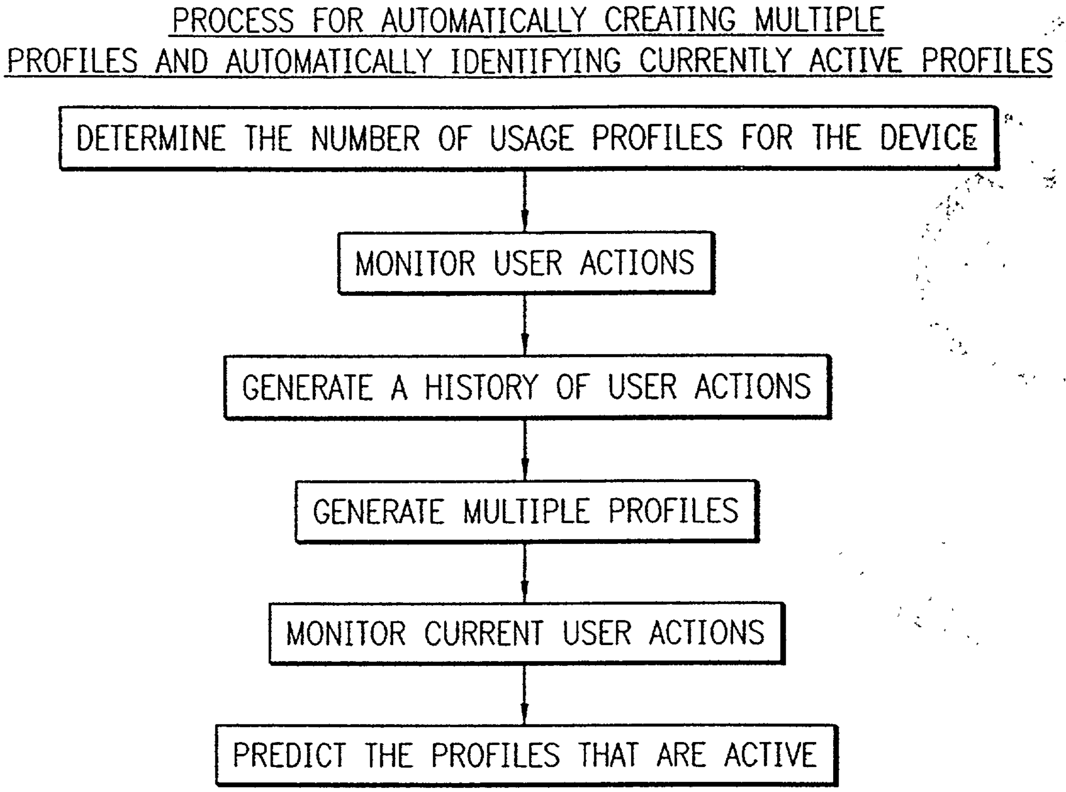

PROCESS FOR AUTOMATICALLY CREATING MULTIPLE PROFILES AND AUTOMATICALLY IDENTIFYING CURRENTLY ACTIVE PROFILES
DETERMINE THE NUMBER OF USAGE PROFILES FOR THE DEVICE
MONITOR USER ACTIONS
GENERATE A HISTORY OF USER ACTIONS
GENERATE MULTIPLE PROFILES
MONITOR CURRENT USER ACTIONS
PREDICT THE PROFILES THAT ARE ACTIVE

FIG. 35

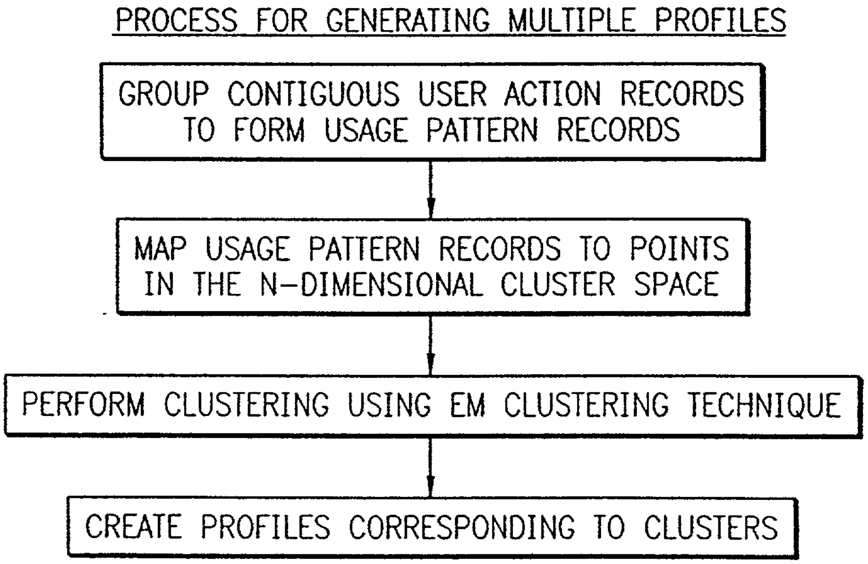
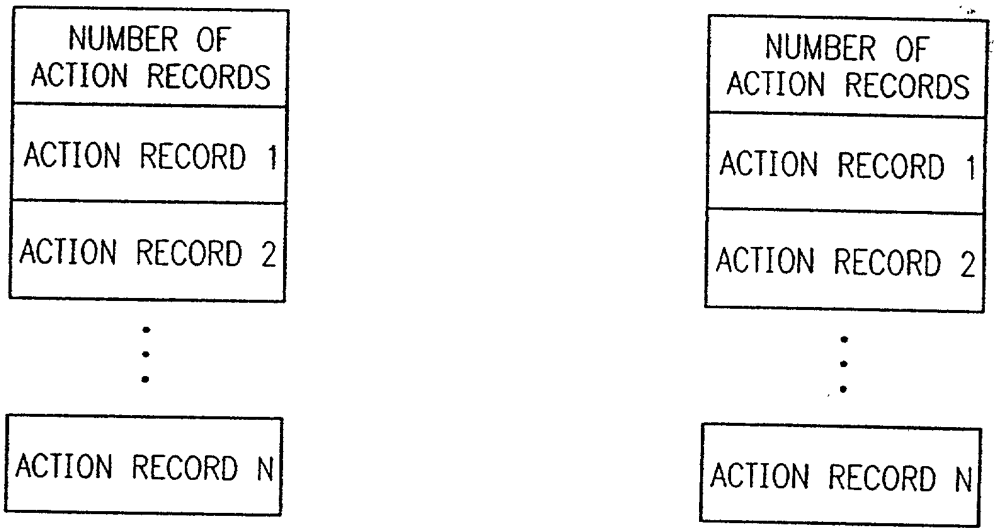

PROCESS FOR GENERATING MULTIPLE PROFILES
GROUP CONTIGUOUS USER ACTION RECORDS TO FORM USAGE PATTERN RECORDS
MAP USAGE PATTERN RECORDS TO POINTS IN THE N-DIMENSIONAL CLUSTER SPACE
PERFORM CLUSTERING USING EM CLUSTERING TECHNIQUE
CREATE PROFILES CORRESPONDING TO CLUSTERS

FIG. 36

B) FORMAT OF USER ACTION RECORD

B) EXAMPLE OF USER ACTION RECORD



C) FORMAT OF HISTORY DATABASE

D) FORMAT OF USAGE PATTERN RECORD

FIG. 37

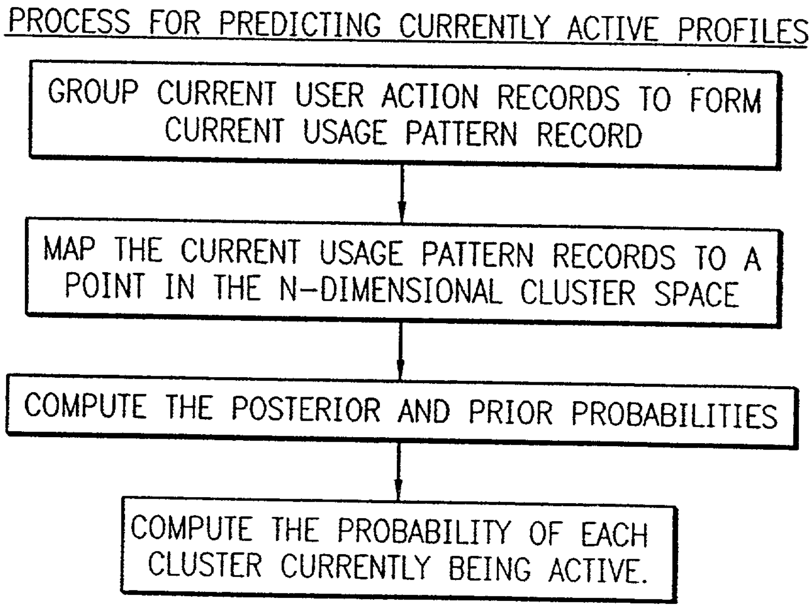
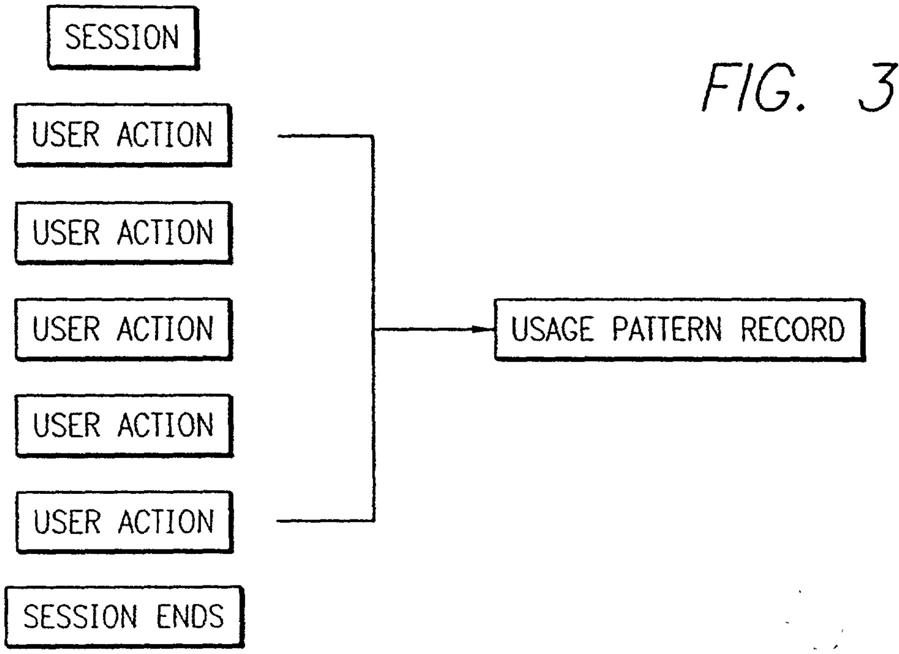
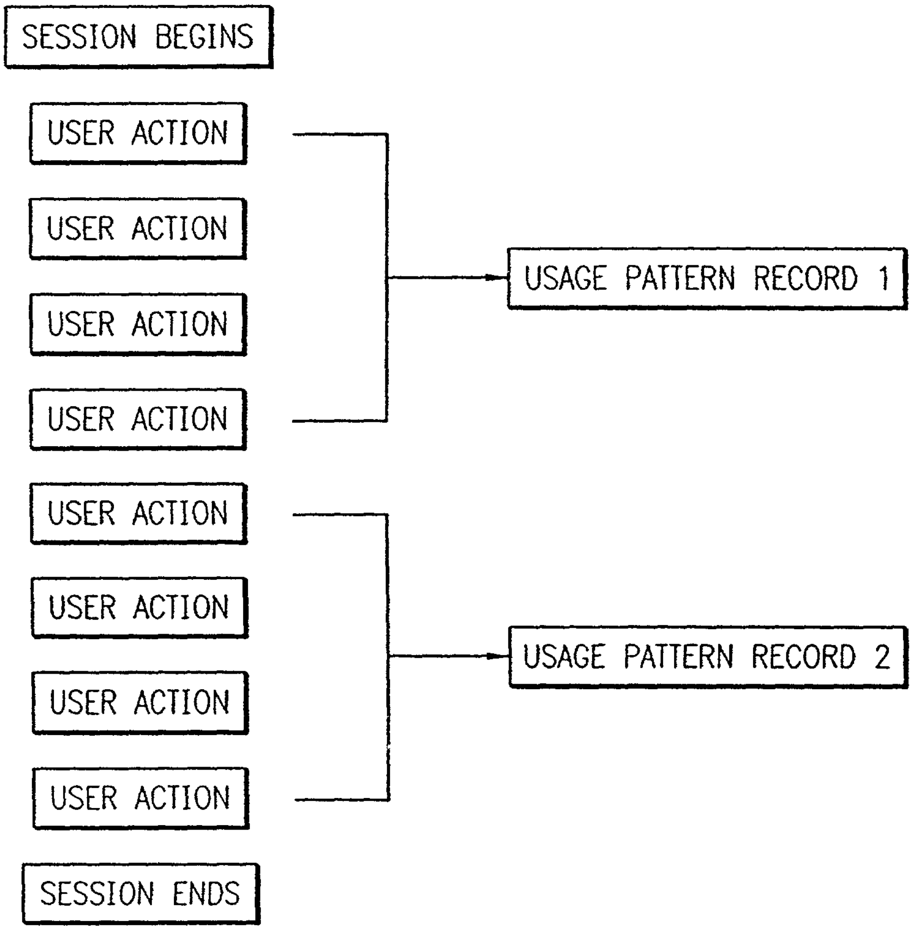


FIG. 40

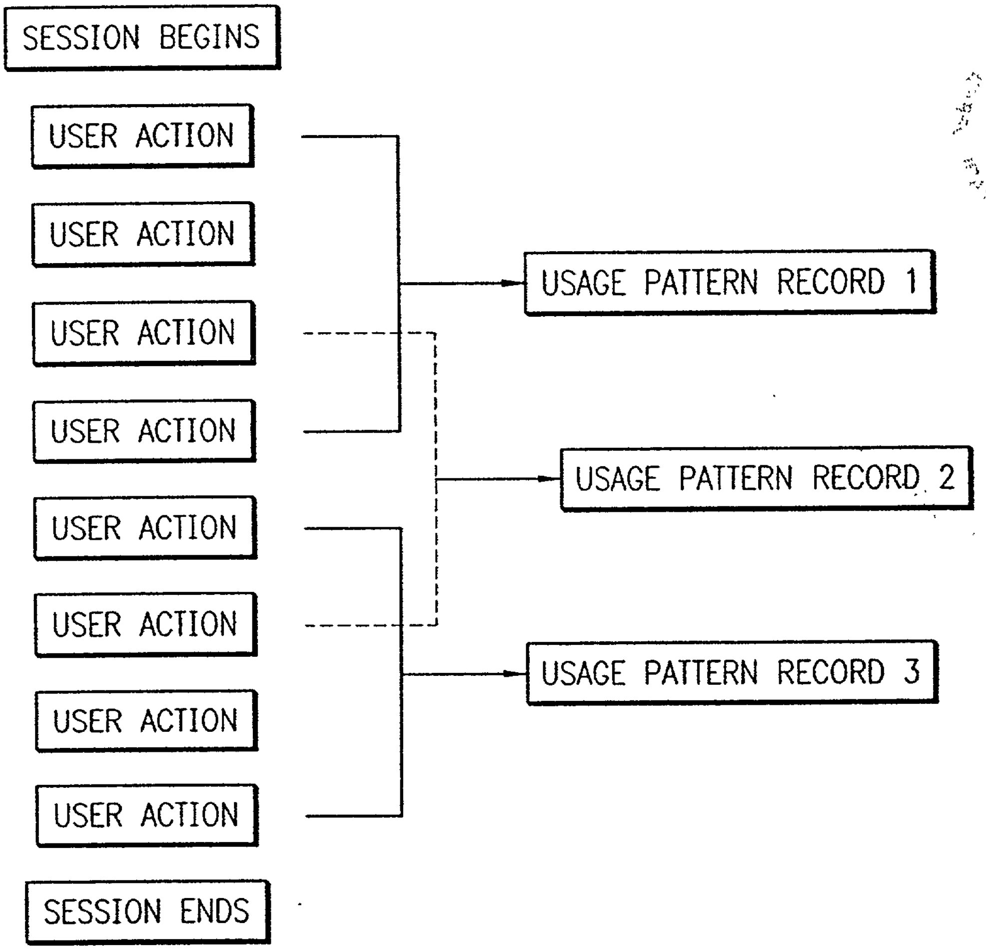
FIG. 38



A) ONE METHOD FOR CREATING USAGE PATTERN



B) ONE METHOD FOR CREATING USAGE PATTERN



ONE METHOD FOR CREATING USAGE PATTERN RECORD

FIG. 39

PROFILE CREATION USING GENERATED CLUSTERS

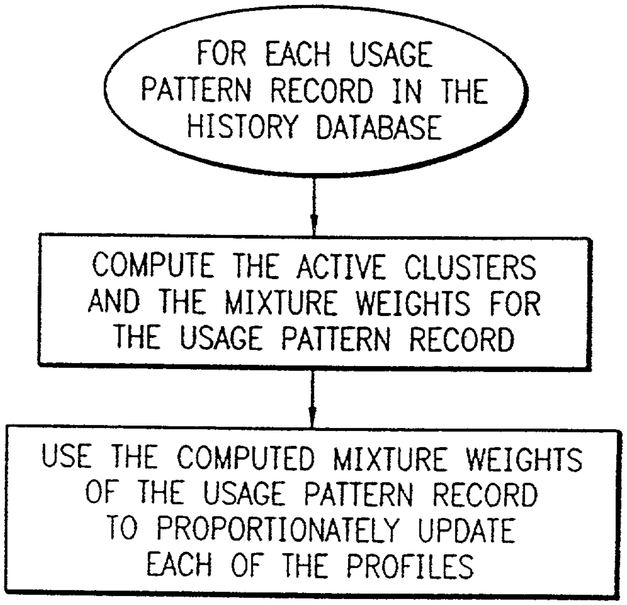
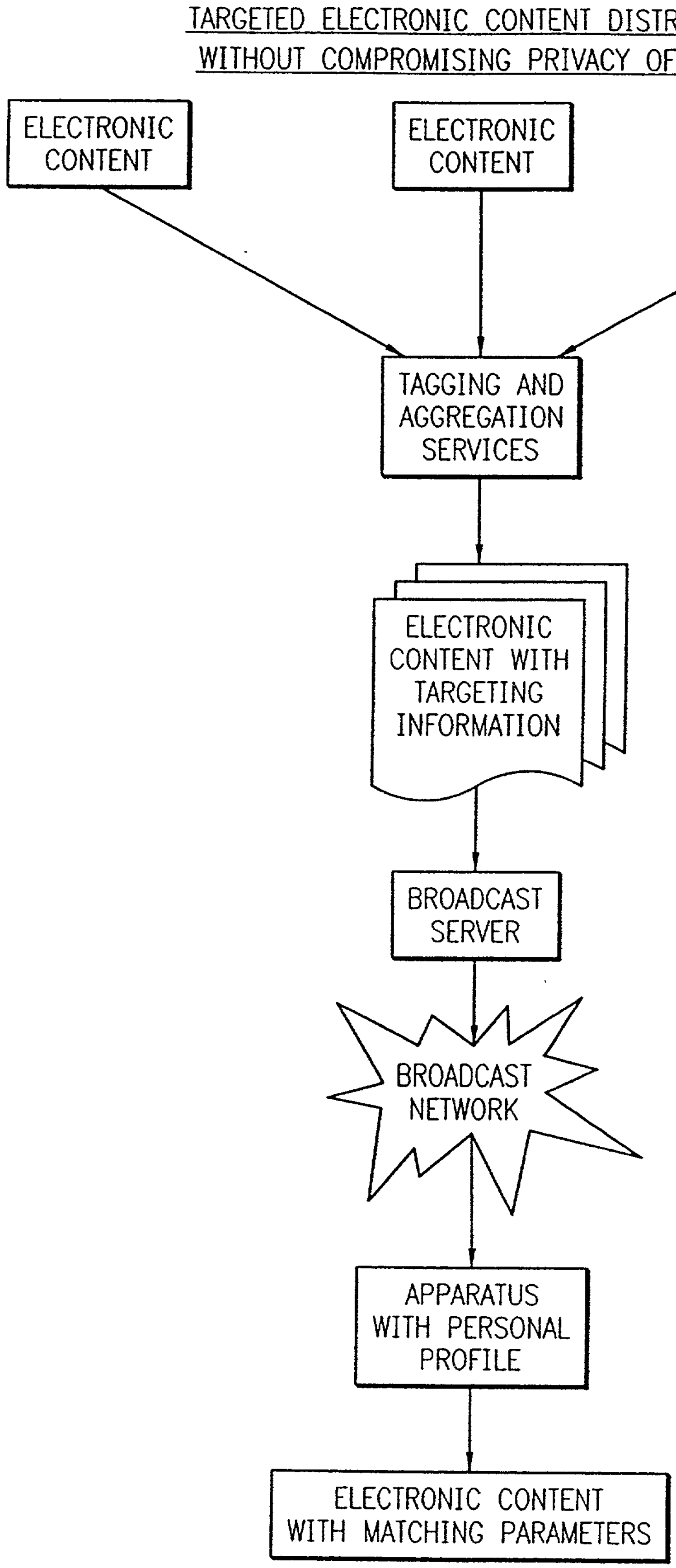


FIG. 41

FIG. 42


TARGETED ELECTRONIC CONTENT DISTRIBUTION WITHOUT COMPROMISING PRIVACY OF USERS
ELECTRONIC CONTENT
ELECTRONIC CONTENT
ELECTRONIC CONTENT
TAGGING AND AGGREGATION SERVICES
ELECTRONIC CONTENT WITH TARGETING INFORMATION
BROADCAST SERVER
BROADCAST NETWORK
APPARATUS WITH PERSONAL PROFILE
ELECTRONIC CONTENT WITH MATCHING PARAMETERS

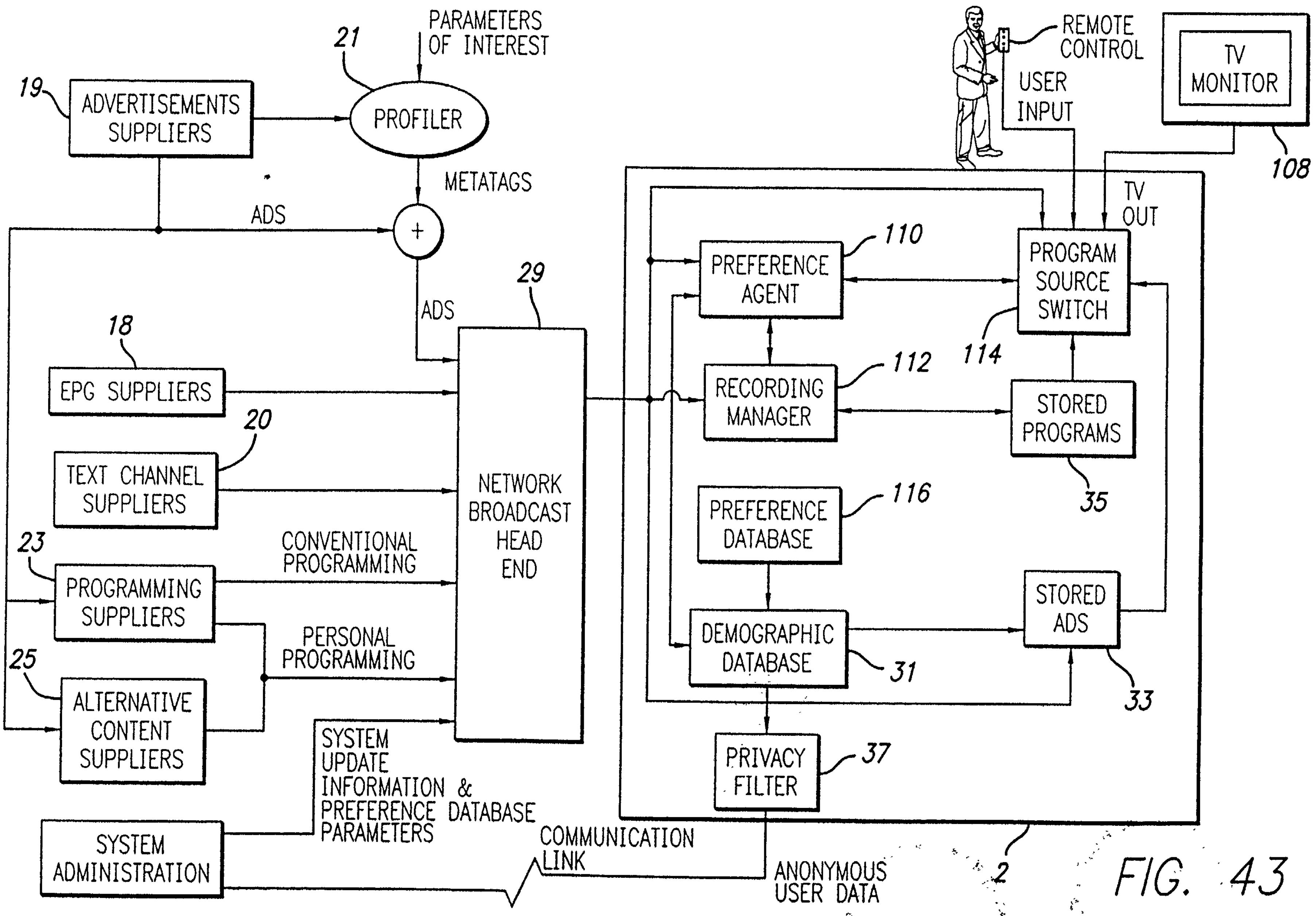

19
ADVERTISEMENTS SUPPLIERS
21
PROFILER
PARAMETERS OF INTEREST
METATAGS
+
ADS
ADS
29
NETWORK BROADCAST HEAD END
18
EPG SUPPLIERS
20
TEXT CHANNEL SUPPLIERS
23
PROGRAMMING SUPPLIERS
CONVENTIONAL PROGRAMMING
25
ALTERNATIVE CONTENT SUPPLIERS
PERSONAL PROGRAMMING
SYSTEM ADMINISTRATION
SYSTEM UPDATE INFORMATION & PREFERENCE DATABASE PARAMETERS
COMMUNICATION LINK
ANONYMOUS USER DATA
REMOTE CONTROL
USER INPUT
TV MONITOR
108
TV OUT
PREFERENCE AGENT
110
PROGRAM SOURCE SWITCH
114
RECORDING MANAGER
112
STORED PROGRAMS
35
PREFERENCE DATABASE
116
DEMOGRAPHIC DATABASE
31
STORED ADS
33
PRIVACY FILTER
37
2

FIG. 43

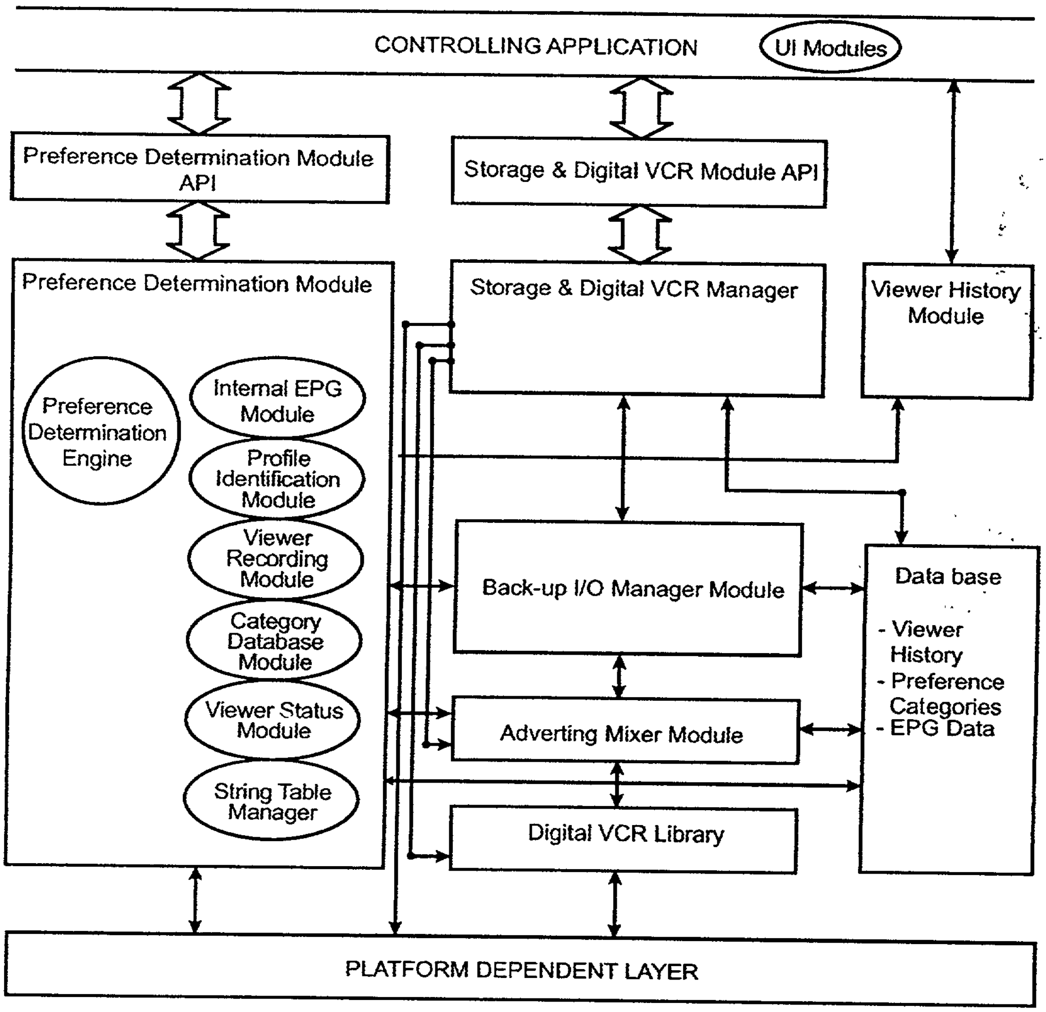

CONTROLLING APPLICATION
UI Modules
Preference Determination Module API
Storage & Digital VCR Module API
Preference Determination Module
Preference Determination Engine
Internal EPG Module
Profile Identification Module
Viewer Recording Module
Category Database Module
Viewer Status Module
String Table Manager
Storage & Digital VCR Manager
Viewer History Module
Back-up I/O Manager Module
Adverting Mixer Module
Digital VCR Library
Data base
- Viewer History
- Preference Categories
- EPG Data
PLATFORM DEPENDENT LAYER

FIG. 44

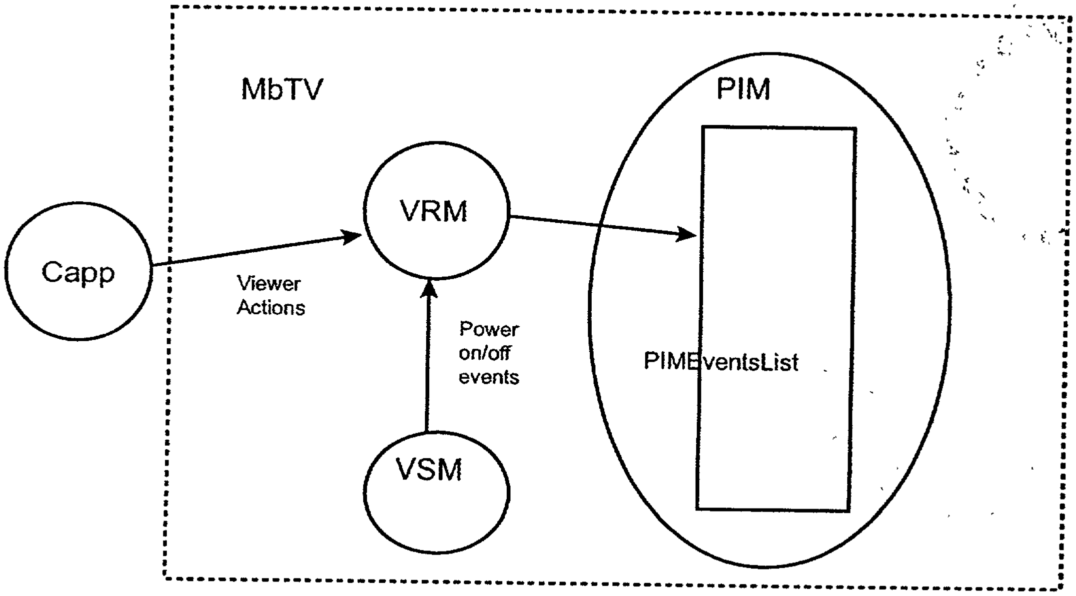

MbTV
PIM
VRM
Capp
Viewer Actions
Power on/off events
PIMEventsList
VSM

FIG. 45

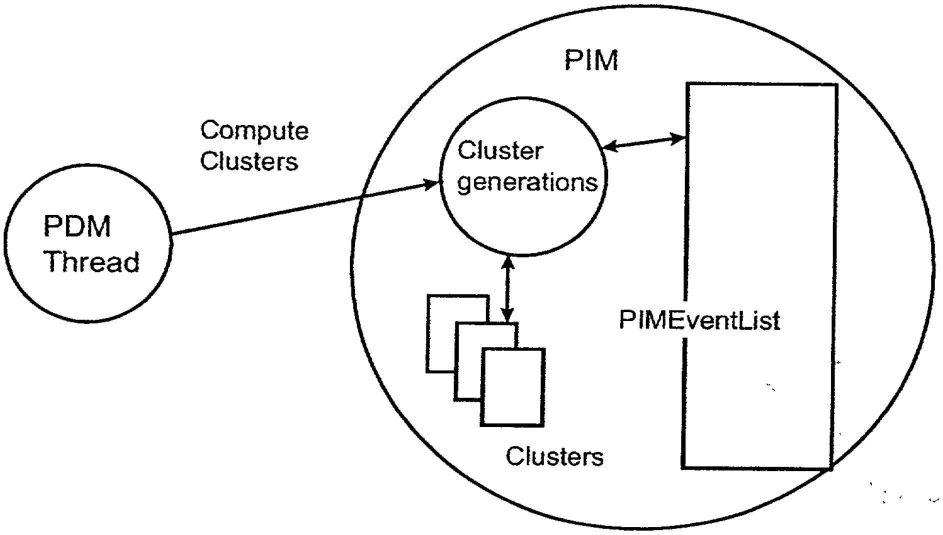

PIM
Compute Clusters
Cluster generations
PDM Thread
PIMEventList
Clusters

FIG. 46

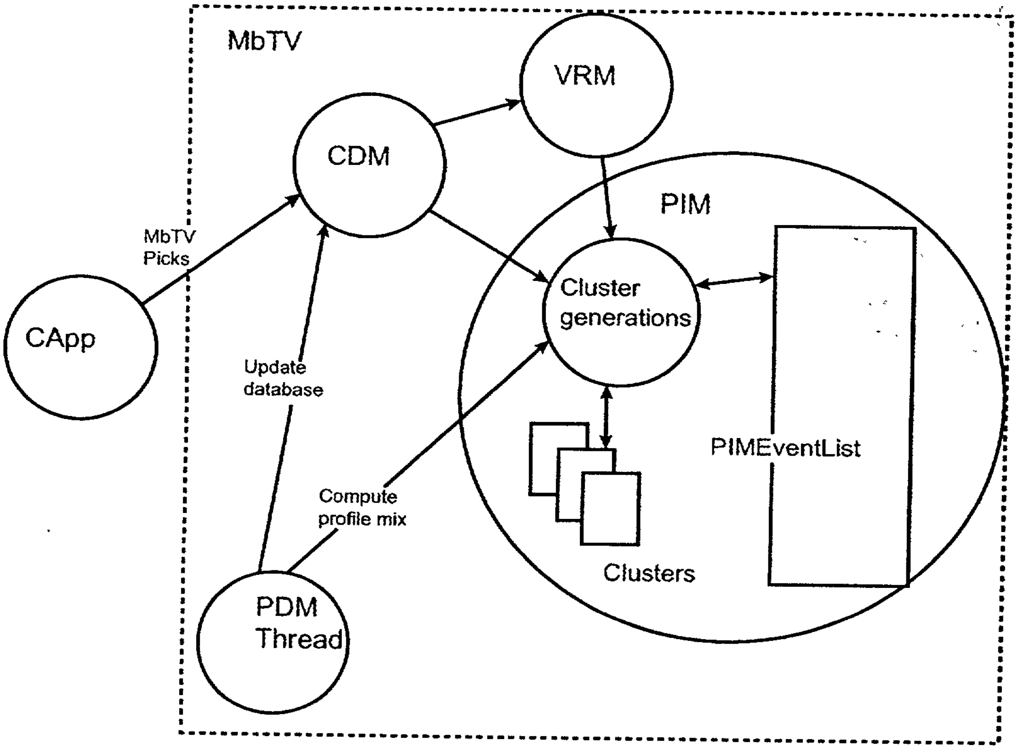

MbTV
VRM
CDM
PIM
MbTV Picks
Cluster generations
CApp
Update database
PIMEventList
Compute profile mix
Clusters
PDM Thread

FIG. 47

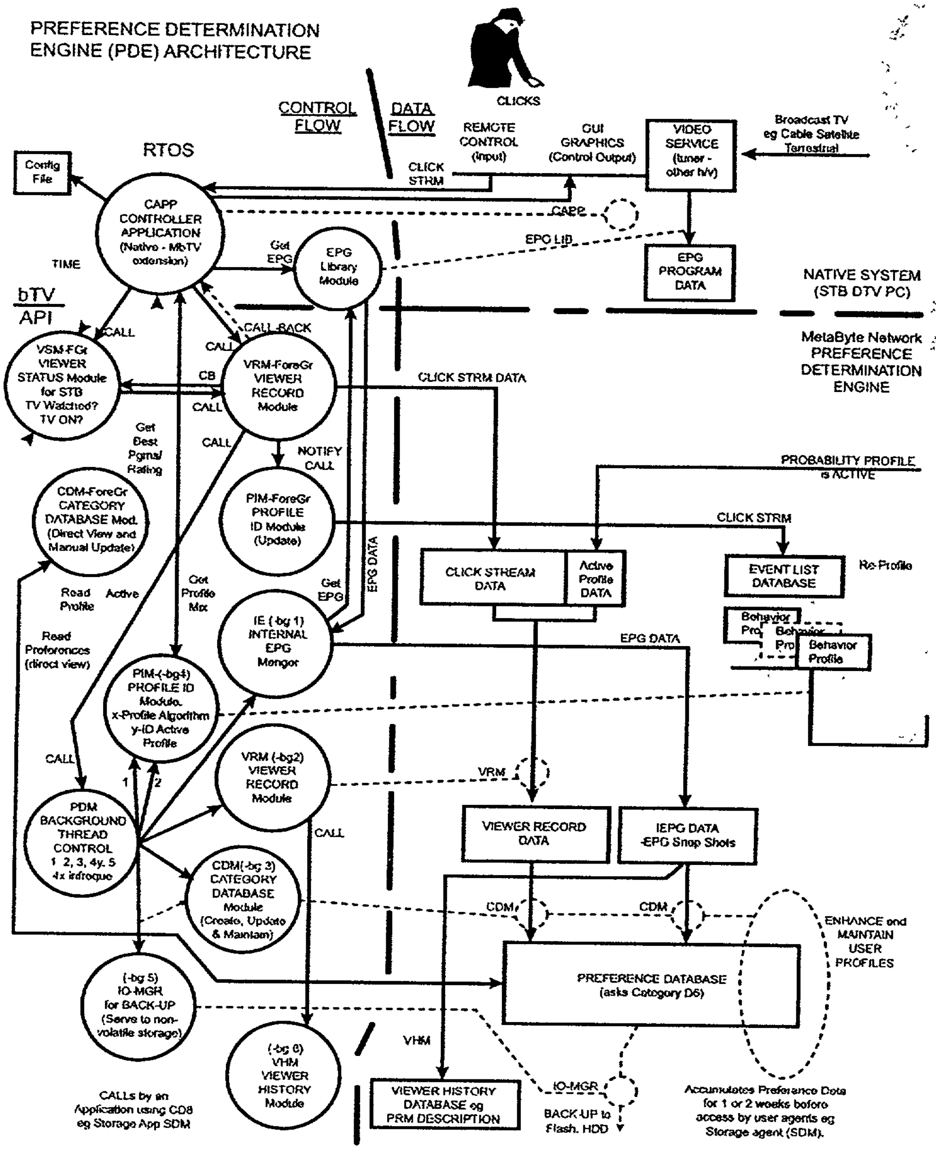

PREFERENCE DETERMINATION ENGINE (PDE) ARCHITECTURE
CONTROL FLOW
DATA FLOW
CLICKS
REMOTE CONTROL (Input)
GUI GRAPHICS (Control Output)
VIDEO SERVICE (tuner - other h/v)
Broadcast TV eg Cable Satellite Terrestrial
RTOS
Config File
CLICK STRM
CAPP CONTROLLER APPLICATION (Native - MbTV extension)
CAPP
EPG LIB
Get EPG
EPG Library Module
EPG PROGRAM DATA
TIME
bTV API
NATIVE SYSTEM (STB DTV PC)
CALL
CALL BACK
CALL
MetaByte Network PREFERENCE DETERMINATION ENGINE
VSM-FGr VIEWER STATUS Module for STB TV Watched? TV ON?
CB
CALL
VRM-ForeGr VIEWER RECORD Module
CLICK STRM DATA
Get Best Pgms/ Rating
CALL
NOTIFY CALL
PROBABILITY PROFILE is ACTIVE
CDM-ForeGr CATEGORY DATABASE Mod. (Direct View and Manual Update)
PIM-ForeGr PROFILE ID Module (Update)
CLICK STRM
EPG DATA
CLICK STREAM DATA
Active Profile DATA
EVENT LIST DATABASE
Re-Profile
Read Profile
Active
Get Profile Mix
Get EPG
IE (-bg 1) INTERNAL EPG Mongor
Behavior Pro
Behavior Pro
Behavior Profile
Read Preferences (direct view)
EPG DATA
PIM-(-bg4) PROFILE ID Module. x-Profile Algorithm y-ID Active Profile
CALL
1
2
VRM (-bg2) VIEWER RECORD Module
VRM
PDM BACKGROUND THREAD CONTROL 1 2, 3, 4y. 5 4x infroque
CALL
VIEWER RECORD DATA
IEPG DATA -EPG Snap Shots
CDM(-bg 3) CATEGORY DATABASE Module (Create, Update & Maintain)
CDM
CDM
ENHANCE and MAINTAIN USER PROFILES
PREFERENCE DATABASE (asks Category D6)
(-bg 5) IO-MGR for BACK-UP (Serve to non-volatile storage)
VHM
(-bg 6) VHM VIEWER HISTORY Module
VIEWER HISTORY DATABASE eg PRM DESCRIPTION
IO-MGR
BACK-UP to Flash, HDD
Accumulates Preference Data for 1 or 2 weeks before access by user agents eg Storage agent (SDM).
CALLs by an Application using CD8 eg Storage App SDM

FIG. 48

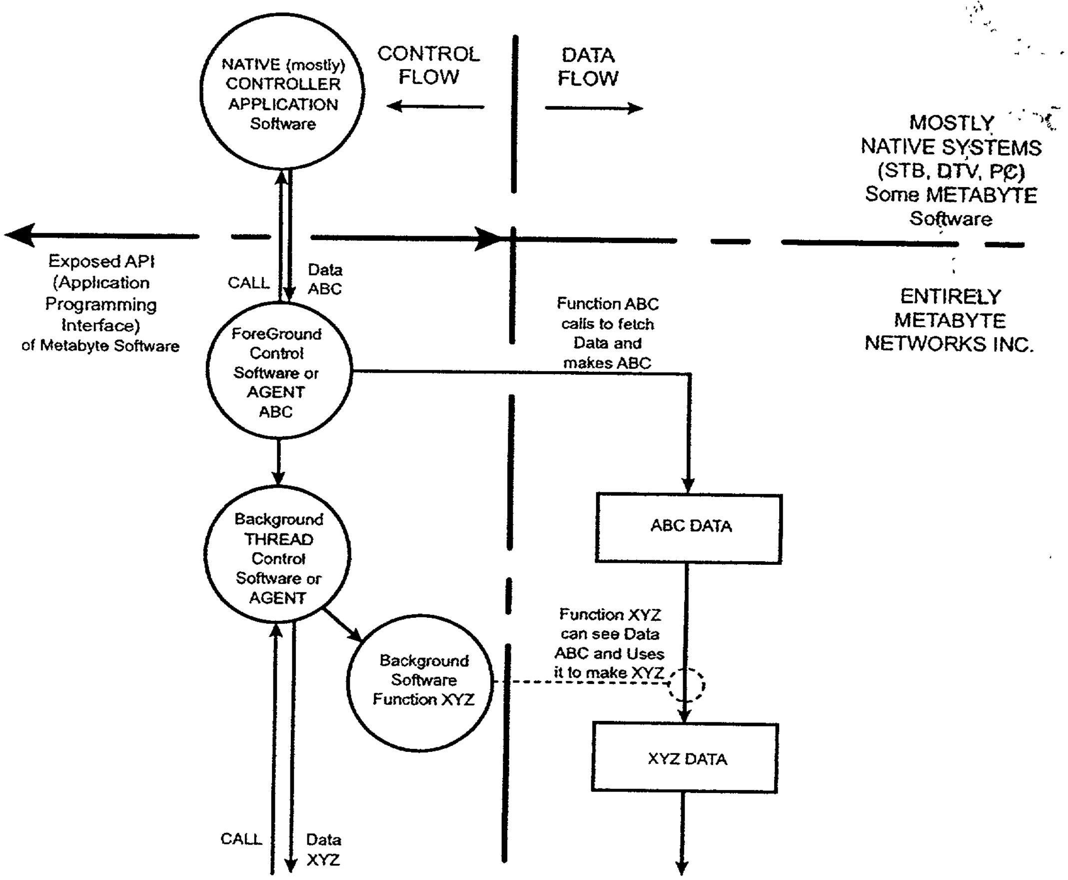

NATIVE (mostly) CONTROLLER APPLICATION Software
CONTROL FLOW
DATA FLOW
MOSTLY NATIVE SYSTEMS (STB, DTV, PC) Some METABYTE Software
Exposed API (Application Programming Interface) of Metabyte Software
CALL
Data ABC
ENTIRELY METABYTE NETWORKS INC.
Function ABC calls to fetch Data and makes ABC
ForeGround Control Software or AGENT ABC
ABC DATA
Background THREAD Control Software or AGENT
Function XYZ can see Data ABC and Uses it to make XYZ
Background Software Function XYZ
XYZ DATA
CALL
Data XYZ

FIG. 49

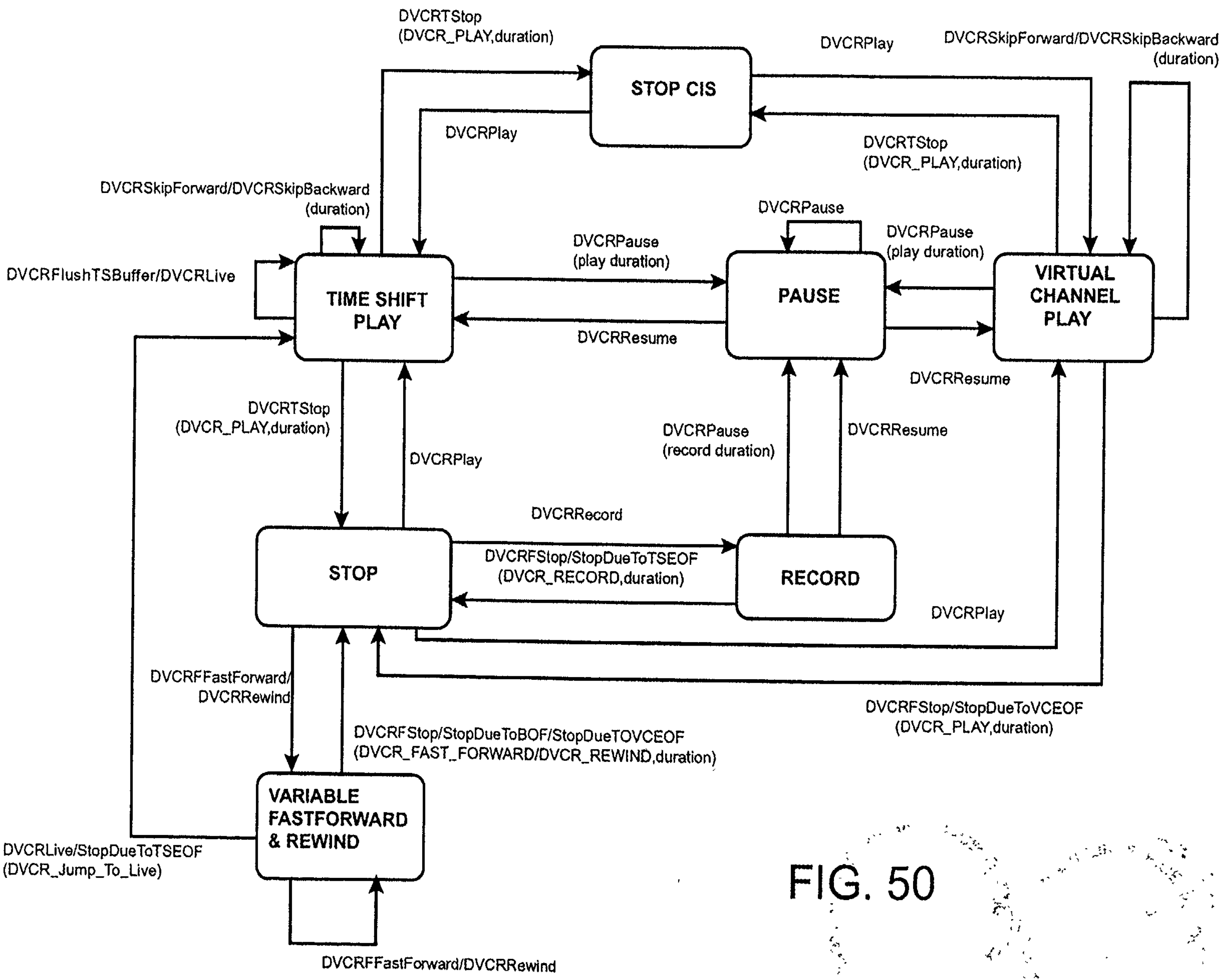

DVCRTStop
(DVCR_PLAY,duration)
STOP CIS
DVCRPlay
DVCRSkipForward/DVCRSkipBackward
(duration)
DVCRPlay
DVCRTStop
(DVCR_PLAY,duration)
DVCRSkipForward/DVCRSkipBackward
(duration)
DVCRPause
DVCRPause
(play duration)
DVCRPause
(play duration)
DVCRFlushTSBuffer/DVCRLive
TIME SHIFT
PLAY
PAUSE
VIRTUAL
CHANNEL
PLAY
DVCRResume
DVCRResume
DVCRTStop
(DVCR_PLAY,duration)
DVCRPlay
DVCRPause
(record duration)
DVCRResume
DVCRRecord
STOP
DVCRFStop/StopDueToTSEOF
(DVCR_RECORD,duration)
RECORD
DVCRPlay
DVCRFFastForward/
DVCRRewind
DVCRFStop/StopDueToBOF/StopDueTOVCEOF
(DVCR_FAST_FORWARD/DVCR_REWIND,duration)
DVCRFStop/StopDueToVCEOF
(DVCR_PLAY,duration)
VARIABLE
FASTFORWARD
& REWIND
DVCRLive/StopDueToTSEOF
(DVCR_Jump_To_Live)
DVCRFFastForward/DVCRRewind

FIG. 50

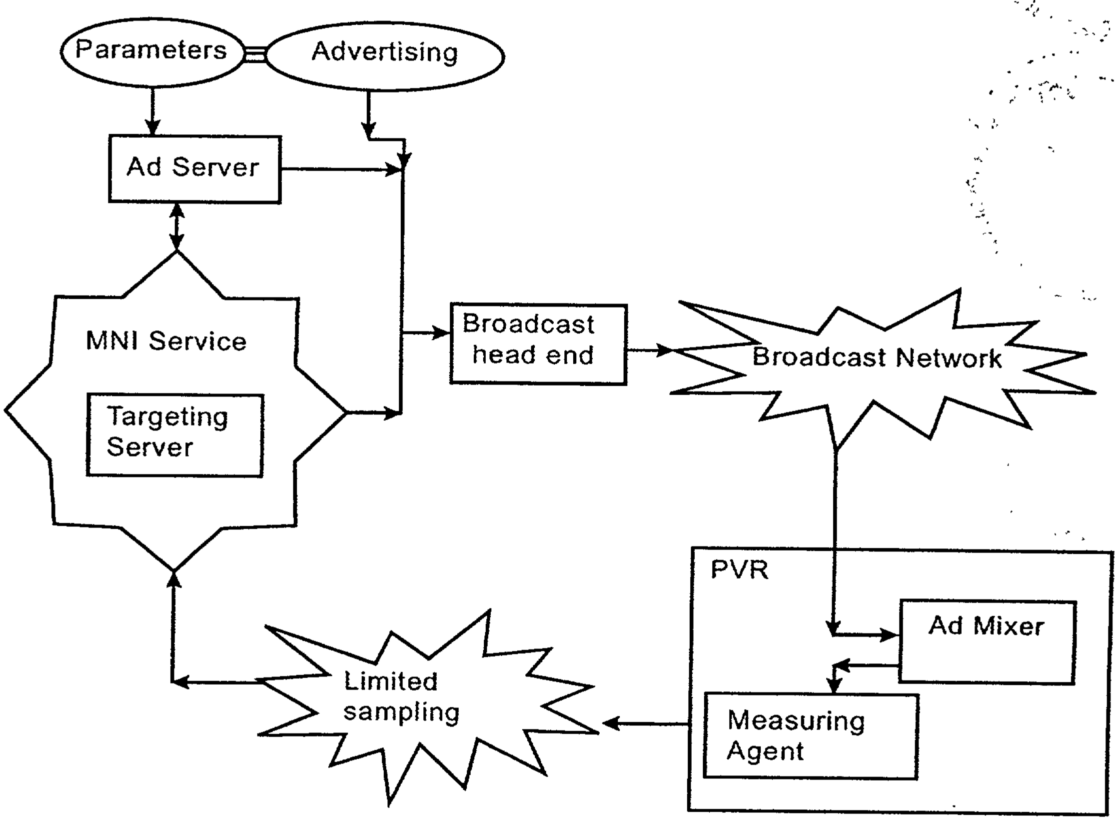

Parameters
Advertising
Ad Server
MNI Service
Targeting Server
Broadcast head end
Broadcast Network
PVR
Ad Mixer
Measuring Agent
Limited sampling

FIG. 51

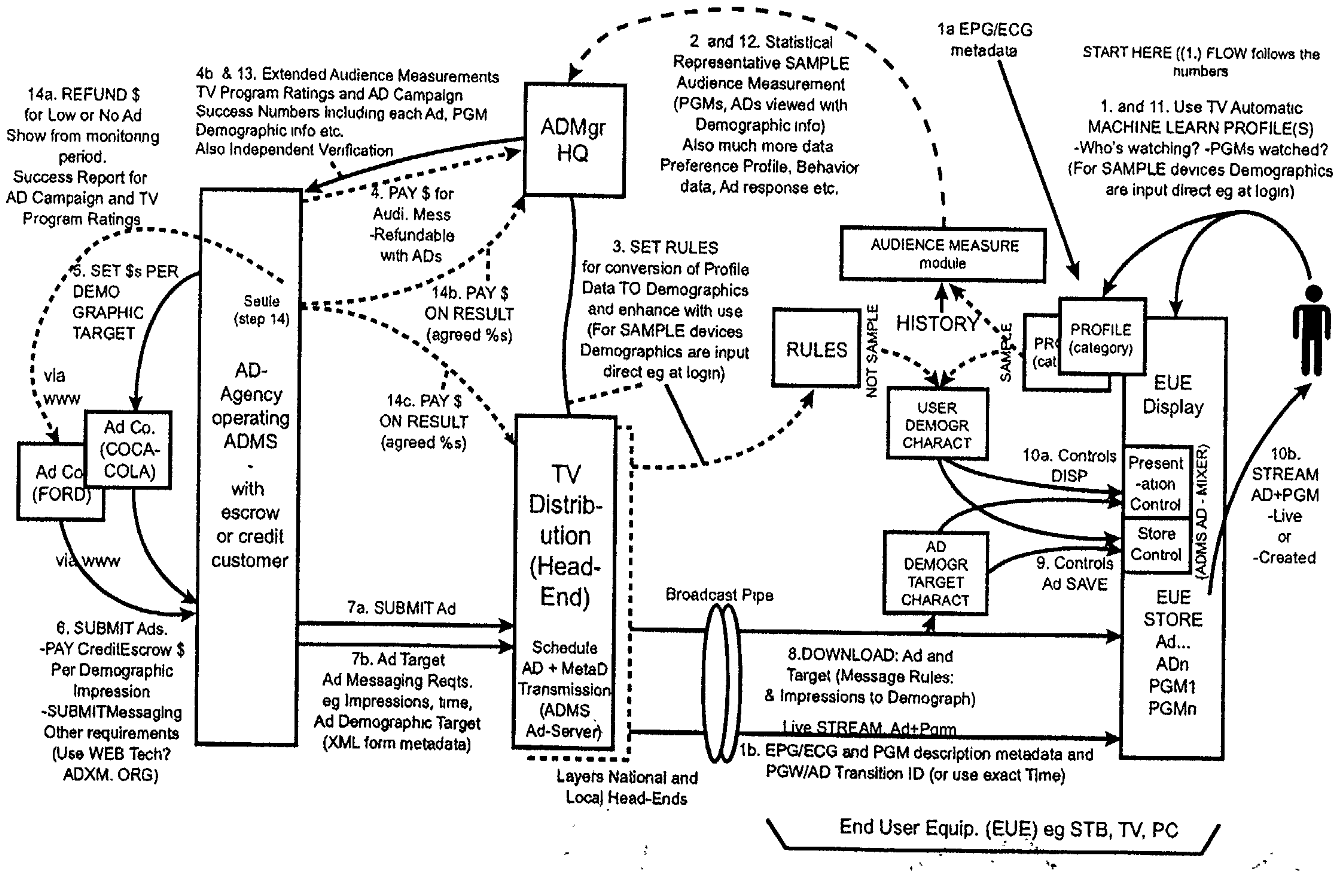

START HERE ((1.) FLOW follows the numbers
1. and 11. Use TV Automatic MACHINE LEARN PROFILE(S) -Who's watching? -PGMs watched? (For SAMPLE devices Demographics are input direct eg at login)
1a EPG/ECG metadata
2 and 12. Statistical Representative SAMPLE Audience Measurement (PGMs, ADs viewed with Demographic info) Also much more data Preference Profile, Behavior data, Ad response etc.
ADMgr HQ
4b & 13. Extended Audience Measurements TV Program Ratings and AD Campaign Success Numbers including each Ad, PGM Demographic info etc. Also Independent Verification
14a. REFUND $ for Low or No Ad Show from monitoring period. Success Report for AD Campaign and TV Program Ratings
4. PAY $ for Audi. Mess -Refundable with ADs
14b. PAY $ ON RESULT (agreed %s)
14c. PAY $ ON RESULT (agreed %s)
5. SET $s PER DEMO GRAPHIC TARGET
via www
Ad Co. (COCA-COLA)
Ad Co (FORD)
via www
Settle (step 14)
AD-Agency operating ADMS - with escrow or credit customer
6. SUBMIT Ads. -PAY CreditEscrow $ Per Demographic Impression -SUBMITMessaging Other requirements (Use WEB Tech? ADXM. ORG)
7a. SUBMIT Ad
7b. Ad Target Ad Messaging Reqts. eg Impressions, time, Ad Demographic Target (XML form metadata)
3. SET RULES for conversion of Profile Data TO Demographics and enhance with use (For SAMPLE devices Demographics are input direct eg at login)
TV Distrib-ution (Head-End)
Schedule AD + MetaD Transmission (ADMS Ad-Server)
Layers National and Local Head-Ends
Broadcast Pipe
AUDIENCE MEASURE module
HISTORY
RULES
NOT SAMPLE
SAMPLE
PR (cat
PROFILE (category)
USER DEMOGR CHARACT
AD DEMOGR TARGET CHARACT
10a. Controls DISP
9. Controls Ad SAVE
EUE Display
Present -ation Control
Store Control
(ADMS AD - MIXER)
EUE STORE Ad... ADn PGM1 PGMn
10b. STREAM AD+PGM -Live or -Created
8.DOWNLOAD: Ad and Target (Message Rules: & Impressions to Demograph)
Live STREAM Ad+Pgm
1b. EPG/ECG and PGM description metadata and PGW/AD Transition ID (or use exact Time)
End User Equip. (EUE) eg STB, TV, PC

FIG. 52

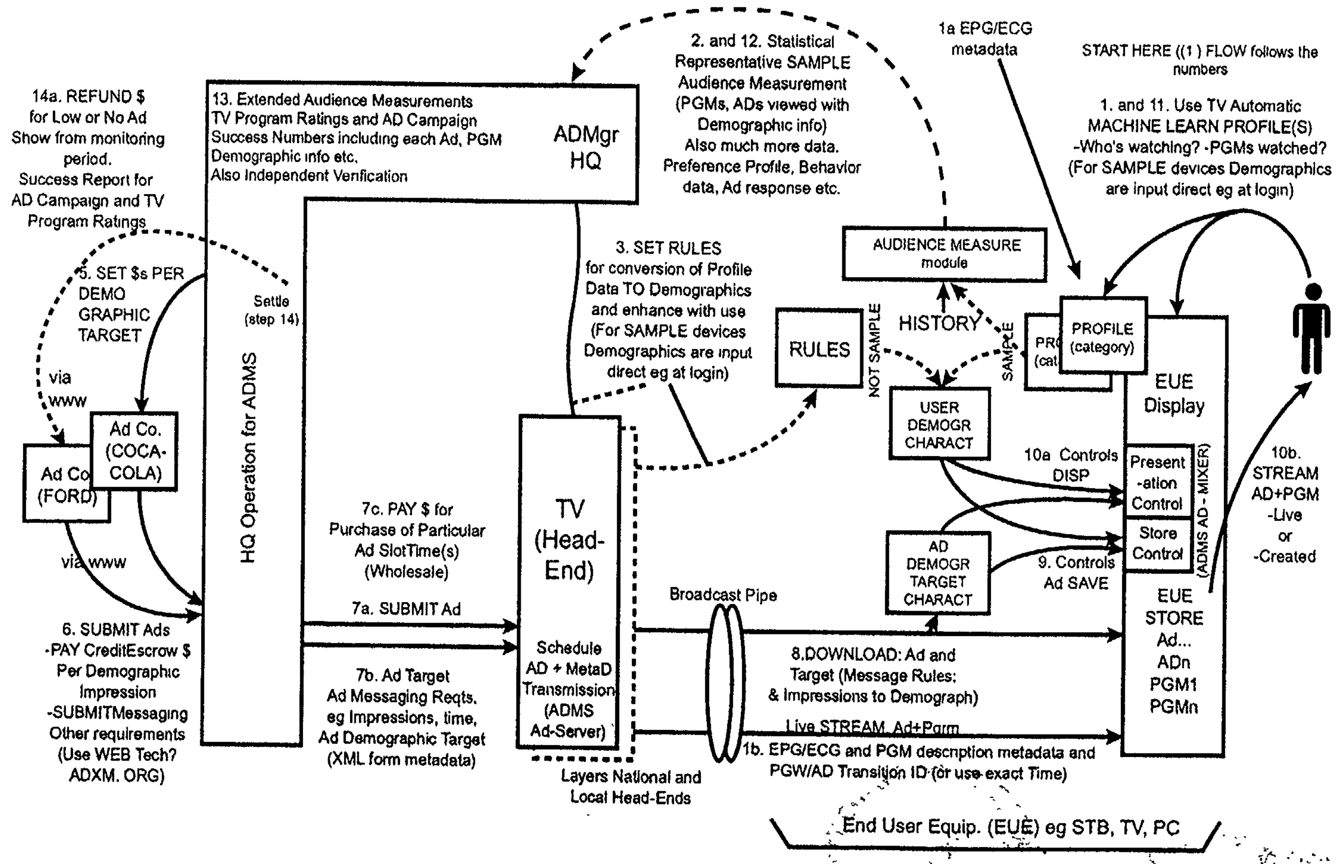

START HERE ((1) FLOW follows the numbers
1. and 11. Use TV Automatic MACHINE LEARN PROFILE(S) -Who's watching? -PGMs watched? (For SAMPLE devices Demographics are input direct eg at login)
1a EPG/ECG metadata
2. and 12. Statistical Representative SAMPLE Audience Measurement (PGMs, ADs viewed with Demographic info) Also much more data. Preference Profile, Behavior data, Ad response etc.
13. Extended Audience Measurements TV Program Ratings and AD Campaign Success Numbers including each Ad, PGM Demographic info etc. Also Independent Verification
ADMgr HQ
14a. REFUND $ for Low or No Ad Show from monitoring period. Success Report for AD Campaign and TV Program Ratings
5. SET $s PER DEMO GRAPHIC TARGET
via www
Settle (step 14)
HQ Operation for ADMS
Ad Co. (COCA-COLA)
Ad Co (FORD)
via www
6. SUBMIT Ads -PAY CreditEscrow $ Per Demographic Impression -SUBMITMessaging Other requirements (Use WEB Tech? ADXM. ORG)
7c. PAY $ for Purchase of Particular Ad SlotTime(s) (Wholesale)
7a. SUBMIT Ad
7b. Ad Target Ad Messaging Reqts. eg Impressions, time, Ad Demographic Target (XML form metadata)
3. SET RULES for conversion of Profile Data TO Demographics and enhance with use (For SAMPLE devices Demographics are input direct eg at login)
TV (Head-End)
Schedule AD + MetaD Transmission (ADMS Ad-Server)
Layers National and Local Head-Ends
Broadcast Pipe
RULES
NOT SAMPLE
HISTORY
SAMPLE
AUDIENCE MEASURE module
PRO (cat
PROFILE (category)
USER DEMOGR CHARACT
AD DEMOGR TARGET CHARACT
10a Controls DISP
9. Controls Ad SAVE
EUE Display
Present -ation Control
Store Control
(ADMS AD - MIXER)
EUE STORE Ad... ADn PGM1 PGMn
10b. STREAM AD+PGM -Live or -Created
8.DOWNLOAD: Ad and Target (Message Rules; & Impressions to Demograph)
Live STREAM Ad+Pgm
1b. EPG/ECG and PGM description metadata and PGW/AD Transition ID (or use exact Time)
End User Equip. (EUE) eg STB, TV, PC

FIG. 53